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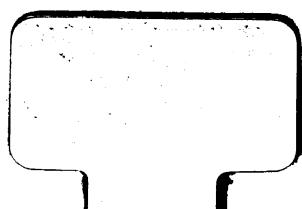
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THREE LECTURES
ON
EDUCATION,

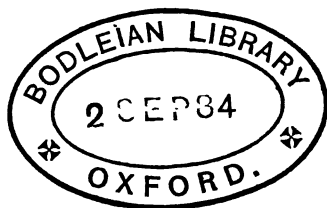
BY
F. G. FLEAY,

READ AT
NEWTON HALL, NOVEMBER, 1882.

WITH A PREFACE BY
FREDERIC HARRISON.

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PREFACE.

I HAVE been asked to explain the scope and occasion of the following Lectures, as having been to some extent responsible for their preparation by the author. The Positivist Society, in its work of organizing a system of popular teaching in the Sciences at Newton Hall, found the need of a general statement of the plan of Education put forth by Auguste Comte, which it is attempting to institute there in its essential features. Mr. Fleay consented to undertake that task, and the present volume contains the result.

On Mr. Fleay's relation to practical Education and also to the system of Positivism, a few words are needed. These Lectures are not the work of an adherent of Comte, who expounds his theory of Education from a book knowledge of the Positive Polity. On the contrary, they are the views of a man who has passed twenty years in the practical work of a professional teacher, and who did not study Comte until his professional life as a teacher was ended. His own convictions about Education had been formed quite independently, as the result of experience, tested by constant appeal to a very varied practice. The coincidences therefore, in the practical conclusions of one of our most completely trained University teachers with the general theory of the philosopher are in the highest degree instructive.

Mr. Fleay's own academic training and professional career, over a period of 40 years, are of an unusually comprehensive kind; inasmuch as, both at school and at Trinity College, Cambridge, he was himself distinguished in Languages, in Mathematics, and in the Moral and Physical Sciences; and in a career of twenty years as a Schoolmaster and Lecturer, he has been engaged in teaching Mathematics, Astronomy, Chemistry, Natural Science, Languages, and

Literature. As Head-Master for six years of the Modern and Scientific Side of the Leeds Grammar School, and subsequently as Head-Master of three other schools, he has had a personal experience in organizing the education of the young which falls to the lot of few. It was not till after the whole of his experience had been gained that Mr. Fleay devoted himself to study, relinquished holy orders, and seriously undertook the mastery of Comte's philosophical works.

To the Religion, or rather it is more exact to say, to the Worship of Humanity, in the sense applied to it by Auguste Comte, Mr. Fleay reserves his assent; and it was not as a professed exposition of the religious scheme of Positivism that these Lectures were given. Their business was to deal with the systematic training of the young in Physical and Moral Science down to the age of twenty-one. The degree to which Mr. Fleay has assimilated the general philosophy of Comte is sufficiently apparent to the reader. It is equally obvious that he does not deal with Education from any academic point of view, as an accumulation of knowledge for its own sake, but, as stated in the opening paragraph of the first lecture, the Formation of Character, Intellectual and Moral. Education is throughout regarded from its social side, as a moral and practical, not merely a mental training. I am not myself in the habit of seeing any strict contrast between Philosophy and Religion, Sympathy and Worship. They are related as the part to the whole, the organ and the function. And if nothing is directly said about worship in the Lectures in the conventional sense of this term, all that is urged in the Third Lecture as to the educational uses of Mythology, Poetry, and Fiction, is in complete harmony with what I understand Comte to have meant by his language about the Worship of Humanity.

There are four cardinal features of Education, viewed in its relation to the social Polity, in which the scheme of Comte is peculiarly emphatic, and wherein it goes counter to the current theories of our time. In all of these the

experience of Mr. Fleay is of great interest, and they are all insisted on in the following Lectures. According to Comte, Education must be free, universal, organic, and encyclopædic. That is to say, in the first place, there is no healthy education whilst it is in the hands of the State; or whilst it is the monopoly of privileged official bodies, be they academic or bureaucratic; nor can any Education thrive under the orders of a centralised army of inspectors and examiners. Education must be free in another sense. It is not to be bought and sold like butcher's meat, and regularly subject to the higgling of the market, and the law of supply and demand. Payment by results can do as little for Education as it could do for Government, Religion, or Poetry.

In the next place, the essential purpose of Positivist principles is to provide Education for all; to place it on a popular, not a class footing; to make it the great connecting social bond. Under the academic and bureaucratic theory, Education is a graduated thing, apportioned out, like an undertaker's bill, to the pretensions of certain favoured or vulgar classes. Education is a really anti-social institution whilst it remains the great instrument and badge of social privileges. It is true, that professional and technical instruction, by the nature of the case, must be varied to the wants of particular functions. But the moral, scientific, and artistic education, which is the basis of all technical training, should be offered to all citizens, and be the same substantially for all.

Thirdly, the only Education worth having from the point of view of society is an organic education. That is, a complete training for the life of a citizen, not a technical training in a given profession:—general, not specialist; abstract, not concrete, with a social, not a mental, standard as its aim. The true educator should be quite as much priest as professor; and should look to make his pupil a citizen rather than either. The instruction given by pedantic specialists in juvenile barracks, is every day becoming more of a technical drill. Our one hope is to go back to

the idea of all true apostles of Education—treat it as a social function for the forming the characters of good citizens.

Lastly, says Comte, the truly organic education, such as can form characters as a whole and minds all round, must be a training in the cardinal conceptions of human science. That is, it must treat systematically the dominant methods and results of logical, physical, and also of moral truth. Such an organic teaching is impossible without a solid philosophy, and a radical classification of human knowledge. Nor is this possible unless the co-ordination of the various sciences be not only understood in theory by the teacher, but be practically realised in the work of teaching. On this head, in a special manner, we may trust the experience of Mr. Fleay. He is probably one of the few living teachers we have who is at once fitted by his general training and studies to give such an education, and who has had practical knowledge of what can be done to accomplish it as a result.

Positivism itself, at least for the present, is in effect a scheme of general Education. Give but the full meaning to the term Education as the formation of character, intellectual and moral; take the true end of Education as the development of a healthy state of society; remember all that is implied in the word, general Education—that is, an Education real, useful, certain, precise, organic, relative, extended to all for the common service of Humanity; and the term General Education is nearly an answer to the question, What is the aim of Positivism?

Without pretending that the full sense of Education can be illustrated in three Lectures, the following pages will be found to treat of some of the leading features in that which is the want of our age.

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NEWTON HALL,
FLEUR-DE-LIS COURT, FETTER LANE, E.C.
FEB., 1883.

HOMER, 95.

THREE LECTURES ON EDUCATION.

LECTURE I.

ON SOME OF COMTE'S EDUCATIONAL PRINCIPLES.

IN A. Comte's "Synthèse," page 4, occur these words:—

This synthesis is intended to guide the general arrangement of universal education in conformity with the final indications of my principal treatise. For it to perform this office, it will be sufficient to fill up in it at convenient times the gaps that I am now compelled to leave in its general plan. The concrete or practical curriculum (*encyclopédie*) will be sufficiently outlined in the last division. [This volume was never written.] But the abstract or theoretic curriculum cannot be sufficiently laid down in the other two, which will relate only to the two extreme terms. Nevertheless, the fundamental science and the highest science being completely organised therein, my successors will easily extend the argument to the intermediate sciences, of which the physico-chemical group alone will require any prolonged labour. ("Synthèses," page 4.)

This Synthesis of Positivism, on which A. Comte was engaged in his final years of work, would, had he lived to complete it, have contained a full statement of his views on Education; that he did not live to accomplish this work is the more to be regretted because there is no subject on which prevalent theories and customary practices are so influenced by the anarchy which has invaded the thoughts and beliefs of the present time. So far are we from any consistent doctrine on this matter, that our received authorities have not even agreed as to what they mean by Education. One of the most influential writers thereon, Professor Bain, assumes in the very title of his treatise that Education is a Science. This is so opposed to the views of those who,

with Comte, regard Education as an Art, nay, as the highest of all arts, that it is desirable to state at the commencement of this series of lectures in what sense I use the word. It is necessary in such circumstances to throw aside the valuable rule that the proper place of definition is at the end, not at the beginning, of an exposition.

By Education, then, I mean "the voluntary action of mind upon mind for the purpose of influencing the formation of character," intellectual and moral. These are the words of W. J. Fox; sufficient, I think, and to the purpose. It would, of course, in three hours be impossible to treat of such a subject with any fulness; that would need a volume, such a volume as Comte himself intended to dedicate to it, such as it is to be hoped some competent successor of his will before long compose. All that I can expect to accomplish here and now is a mere sketch, of which to-day's lecture is a first instalment, wherein I propose to consider a few of those principles based on science, biological or psychological, which have been enunciated by Comte as the foundations of the Art of Education. Among these there is none more important than that of the different stages, viz:—That the whole system of education should be altered at definite periods of life; about the ages of 7, 14, and 21. The received doctrine among schoolmasters, or rather the accepted practice, is that no break should be introduced in the training of pupils, and even the large public schools, which heretofore seemed to be in a sort of rough agreement with Comte's theory, are now establishing preparatory schools, in which the system of the upper schools shall be led up to by similar discipline and similar method of teaching in the lower. This has a plausible air of consistency about it, while Comte's method looks at first sight artificial and constrained. The full defence of it will naturally evolve in our second and third lectures, when I shall consider in some detail the training to be given in the second and third stages; but the ground of the law itself may be noticed now. Of course the importance of the biological change at the epoch of puberty is denied by no one, and the probability that this should be accompanied by a psychological change is manifest enough; but it has been said to me, Why a change of method at the age of 7? Surely the fact that a child "is cutting its second teeth" has nothing to do with his education, nor indeed with his mental development in any way. If Comte had shown us

that the child was growing a second brain it might be something to the purpose—but second teeth! It is easy to distort the teaching of any great man in this way. Ruskin used exactly the same sort of sophistry against the botanists, and Cuvier's use of the hard skeleton and teeth for classificatory purposes was similarly assailed. Comte no more imagined that the second dentition was directly connected with change of method in education than Cuvier supposed that the bones were the highest in development of the bodily organs of an animal; but in both cases it was necessary to appeal to the evidence that was accessible—the bones were preserved in fossil skeletons, when heart and skin and brains had rotted into indistinguishable slime: the cutting of teeth is a phenomenon palpable to many who know nothing of the laws that govern the growth of brain. It is in these laws that the true ground of Comte's method must be definitely sought. These, so far as they are known, confirm his epochs; the extremely rapid growth of the brain during the first period, succeeded by the moderate growth during the second, and that by a much slower one in the third, point to similar conclusions to his. The development of high artistic power in exceptional instances (of which Mozart and Landseer are well-known examples) at the age of 7,—whereas scientific capability is almost unknown at less than 14,—still further confirms him. But the universal testimony of schoolmasters and physiologists, who may be supposed to have had the largest experience on this point, is for the present our surest criterion. I will quote the words of one, Dr. Draper, who was far from sympathizing with Comte generally, as to the second epoch. "Up to the fourteenth year," he says, "the human being lives solely for itself . . . after that period its life is for the future and is in relation to the race." As to the first epoch, I appeal to all mothers, and to the growing dissatisfaction with the undue forcing of children under 7 to intellectual work, which has found utterance even in the reports of Government inspectors. Mr. Colt Williams, for instance, tells us that young pupils have too much work and too little play now, and that, if the present curriculum be extended, the physical vigour of our country lads and lasses will deteriorate. (*Echo*, 7th September.) On the whole I take this law of stages to be the most fundamental and important of all that Comte has given us on this subject of Education, although I must repeat that

its full significance can not be seen till we have given it the fuller examination which will occupy us in the two next lectures.

Another important principle is, that all study is relative to Humanity in accordance with his aphorism, *Savoir, pour prévoir, afin de pouvoir*. This cuts at the very root of the prevalent practice of introducing into our curriculum much that is merely ornamental, curious or technical; quantics and covariants; antispastics and polyschematistics; compounds of rubidium and lanthanum; properties of scepacæ and phytocrenacæ; genealogies and lists of geographical names. Some of these may be needed by specialists, as means of arriving at other things that shall be useful to man, but to man in general they are not useful; they are worse than useless, they displace what is useful and cannot be endured. But some may say: Must we not have them in education for specialists in that Technical Education we are now promulgating with such excellent result? Nay; Comte will not hear of technical education; he fully admits the necessity of special teaching by lectures for special professions; but technical education, the teaching of art in any other way than by exercising the art itself, he utterly refuses. Practical men agree with him in this. I well remember when I was organizing my plan of scientific training in the science division of the Grammar School at Leeds, now twenty years since, how, on consulting one of the most extensive and practical engineers in that town, I got this reply from him: "The more chemistry, electricity, heat, mechanics, and so forth you can put into your boys' heads the better; but don't teach them any steam engine; if you do, we shall have more trouble in unteaching than you in teaching, and, in fact, we won't receive pupils in our workshops who have been technically instructed at all." The feeling is different in that town now; but it remains to be seen how long it will remain so. If Comte's view is the true one, as I believe it to be, the real value of all technical colleges will prove to be in their teaching what is scientific, and in exact proportion to their want of technicality.

Closely connected with this maxim is another principle enunciated by Comte, which is at the present time at variance with the usual practice, and has met with scant recognition from theoretic writers. He holds that the entire scientific education of each pupil should be conducted

by a single teacher. As his scientific course would extend through seven years and embrace the whole range of human knowledge, this would involve the following corollaries :—

1. That all pupils would commence their course at the same period of the year. This is not in accordance with English practice, but would not cause sufficient difficulty to need any further notice here.
2. That each centre of scientific education should have attached to it seven professors, each of whom should at one time be lecturing on a different subject, while in the seven years' course each would lecture on all subjects. In the whole of Comte's educational method no proposition can be found so entirely opposed to our habits, to our prepossessions, or to the doctrines of all concerned in education—schoolmasters, professors, inspectors, or expository writers. It is constantly urged, and as constantly acted on, that chemistry can be best taught by the chemist, French by the Frenchman, botany by the botanist; in a word, each special subject by a specialist. So far is this carried in some schools that even the old institution of class-masters is given up, and each master has entrusted to him the teaching of one subject only; History, Latin, English, and so forth, having each their separate teacher, to whom all the classes go in turn for lessons. On the other hand, in some schools each master has a class assigned to him, which he always retains, through all its school career. The common course, however, is for a class to pass from master to master, not as a body, but piecemeal, individual pupils being promoted as they are thought fit; this applies only to the main curriculum, however; certain subjects, such as modern languages, arts and sciences, being relegated to specialists, who receive the classes in turn. This mixed system, which has grown up empirically, cannot have been found successful in practice, or the other methods above instanced would not be introduced as attempts at amelioration. The first system which I mentioned has however been generally given up after trial more or less prolonged. Nor has the second been found more successful. If on the one hand the restriction to one subject has been found intolerable to any teacher of more than average capacity, it has been found next to impossible in the present specialized condition of our education to obtain masters who could teach all subjects. Hence the all but universal adoption of a compromise, resulting in an unmethodical empiricism. But the specialized

education which is at the root of this is to Comte unmitigatedly obnoxious. He holds that as all pupils ought to be made acquainted with the principles of every science that can beneficially influence the conduct of Humanity, so ought every educator to be capable of imparting to his pupils all such principles. Specialism is hateful to him. Specialists, in his view, are men that are not educated, but instructed; they are incapable of even judging what education is as a whole, or how its divisions should be apportioned. Specialists attach undue relative value to their own domains, and try to underrate the worth of other specialities. It is only the man who has traversed the whole territory, and attained to a central point of view, who can map out the country properly. I suppose there can be little doubt that Comte's view would be accepted were it not regarded as Utopian on the ground that teachers of universal acquirement will never be obtained. This, however, is a mistake. The small number of such men arises simply from the fact that specialism is held up for admiration, and is the recipient of all educational rewards, especially at the Universities. Were it not for this there would be a supply of such men abundantly sufficient for all our educational needs. But when such an education as Comte desires is discouraged to the extent of imputing inferiority to the man who possesses it, it cannot be expected that any but a few of the highest minds will strive to attain it.

Another principle of Comte's which has been absurdly misrepresented is, that one education should be given to all alike without distinction of class. This in a country where schools are separated like railway carriages, into first, second, and third class, seems sufficiently ridiculous. Nevertheless, when examined, little will be found belonging to this utterance exclusively that even the British Philistine would object to. For what is it marks this distinction between the classes of schools in England? Not the relative amount of real education, nor even the quality of the teaching. These are often the best in the third class. There are, however, two real marks of diagnosis: one, the age at which scholars leave; the other, the relative amount of Greek and Latin taught them. The former would require no grading of schools if the instruction given was the same in other respects, consequently the whole and sole difference between our graded schools consists in the teaching of the dead languages. I am not going to discuss the question so often,

and sometimes so well, debated as to the desirability of teaching these at all. I have merely to point out that while Comte by no means undervalues a knowledge of these tongues, he does not (how could he?) include them in his list of things necessary to universal education, and relegates them to the limbo of specialities, which contains, among much rubbish, much also that is very valuable to those whom it may concern—not to us, however, now and here.

It may be urged that if we admitted all alike to this education, we should make no provision for the different stations and occupations of future life. But I must first of all remind you that we are speaking of scientific education just now, *i.e.*, from the age of 14 to 21, which, by-the-bye, excludes most third-class schools from discussion here, and saves an explanatory paragraph as to the teaching of modern languages. Now, Comte nowhere speaks of making this education compulsory. On the contrary, he claims absolute freedom for Education; he says that the State ought to abandon all its educational monopolies, that freedom of teaching is a necessity of the first importance, and an indication of the normal condition; that, in fact, no organisation can take place so long as the Temporal Power remains dominant over the Spiritual, which ought to be separated from it. At present, then, and I suppose to some extent even in the normal condition, only those would attend such teaching as were fitted for it, and could gain some advantage from it. Those who were so unfortunate as to be bodily or mentally unfitted would have their peculiar deaf or blind institutions, whether the deafness or blindness were corporeal or spiritual. And of those who did attend, some would get more advantage and some less. Comte would be the last man to claim for all men a perverse equality in any respect. Well, this is what Comte claims as the right of all: equal *access* to the atmosphere of knowledge, to the food of life; each breathes it according to the power of his lungs, assimilates it according to his strength of digestion. What more can be wanted? Is it that technical knowledge which experience teaches us is better learned in the workshop and the hospital, the laboratory and the farm, than in any colleges whatsoever? Or is it that spirit of caste which we describe as an institution of the East, and cherish as a possession in the West? If the former, I would say to such objectors, Purge your intellectual eyesight; if the latter,

Exorcise the wicked demon that possesses you. In any case, misrepresent Comte no longer.

Closely connected with this liberty of education is Comte's doctrine that no political government should give or enforce any education beyond the primary instruction of reading and writing. The tendency of our time, in our own as in other Western countries, is in a direction opposite to this. Governments are gradually assuming authority over secondary education in art and science, theoretical and technical. Yet many reasons may be alleged against this tendency. Beside the necessary separation of the political and spiritual powers, which has been so completely argued by Comte himself, there are many minor considerations which should not be lost sight of. There is the danger of educational institutions being used for party purposes, especially in the teaching of history and social science ; there is the danger of insincerity on the part of teachers, who may be led to think more of pleasing those from whom they derive their payment than of investigating and transmitting truth ; there are the many dangers arising from a system controlled by examinations, and founded on payment by results. These latter require more than a mere mention.

Any conceivable governmental system of education which pays its subordinate educators, must have some means of ascertaining their merits, and some standard by which they shall be estimated. Of course the supreme central authorities, whether appointed by the Government on account of their party politics, or the influence of family connections, or occasionally their fitness for their posts, cannot be subjected to these conditions ; but subordinate teachers must be submitted to inspections and examinations. Their relative position will be assigned to them in proportion as they satisfy the body of inspectors and examiners. But all officials, acting under a fixed system, must necessarily tend to become perfunctory and mechanical. Any improvement, whether in matter or manner of education, can in such a system only take effect after it has been submitted to, and approved by, the central authorities, embodied in new instructions to the inspectors, and enforced by them on the teachers. But this is a long and tedious process ; so tedious, that while it is going on still further improvements will have grown up before the earlier ones have had a trial ; so tedious, as to discourage those who are really capable of improving the system, because they see little probability of

their improvements coming into practice. An attentive study of Mr. H. Spencer's essay on "Over Legislation," will suggest much more on this head than I have time to say now. But far more important than the intellectual are the moral effects of such a system. No great painter, or sculptor, or musician, has ever been formed by Schools of Art or Royal Academies, or the like. Such bodies only keep themselves alive by incorporating the genius that has developed outside them. South Kensington schools may turn out artizans or pianists to any amount, but they will never create Titians or Beethovens. Nor does any one expect them to do so. Yet, in the greatest of the arts, in Education, which surpasses the fine arts as morality surpasses intellect—which fashions, not dead marble and pigment, but living human souls : in the one Art to which all others are, or ought to be, subservient handmaids, we expect to be able to create artists as if they were pots or pans, or bullets ground out by engine work according to law of demand and supply. We take these men, who should be the perfectest of human beings, and examine them by tests which will not tell us whether they be artists or no, but merely whether they be gerund-grinders, arithmeticians, or, in some cases, vivisectionists ; and by these tests we judge if they be fit to form the hearts of our children in feeling rightly, to lead their minds in knowing rightly, to guide their hands in doing rightly. Having thus chosen our philosophers, we tell them that we will pay them (pay being supposed to be the mainspring of all their going) according to results. Such results as our analysis may reach, not results of love as shown in their pupils' actions ; not of wisdom in their thoughts ; not of power in their originality—all these are ethereal, and escape from our ill-sealed retorts in the very process of analysis,—but results of accuracy in spelling words they will never want to use ; of fluency in gabbling over a prescribed lesson learnt by rote parrot-fashion ; of retentiveness in never forgetting whatever it may please us in our wisdom to allow the subordinates to instil into them.

All this is exploded in Comte's system. He holds that education is too high a thing to be recompensed with payment either by result or otherwise. Payment with him belongs to the capitalist, whose function is a lower one. The poet and the painter have always done their best work irrespective of pay. Milton, Cervantes, Shelley, did work

without payment of such kind. The artist must live to do work; he must be supported by a fixed stipend; but his payment is in doing his work. *Vivre pour autrui*: there lies his blessedness. So must the teacher-artist live according to Comte; so must the painter according to Ruskin. Bread and cheese with enough onions to keep him in good temper, says the latter; Enough for subsistence and freedom from care about subsistence, says the former: but also entire freedom in method and power to appoint a successor.

Well it may be said, and very reasonably: Granted that this is possible for the higher, or rather the later, education, from 14 to 21, for which such teachers may be found in sufficient numbers as Comte's scheme requires, only seven of them at each centre, still it is not possible to obtain them for the earlier education from 7 to 14; nor will it ever be possible—the scheme is a mere Utopia. Perhaps, but not in this respect; for Comte does not propose that the earlier education shall be given as at present in schools. He holds that it is possible, and that men will see it to be their duty, to relieve woman of all employment outside the home; and that this being done, women will educate their own children. So, far from these propositions being Utopian, there is some evidence that women are preparing for their future duties to a much greater extent than heretofore; partly by doing much in practical education generally, and still more by educating themselves. They will easily become, they are becoming, capable of this work; and when they are capable, will certainly not delegate it to others. This movement is beginning in the middle class, and will propagate in all directions. No doubt it will be some generations in reaching the proletariat in this country; the delay being due to the population question, which I cannot enter on now.

With regard to the nature of the subject matter which must form the staple of all education, Comte lays down the maxim which anticipates and transcends so much that has been written since his time. He says, that Positive Education must be Real, Useful, Certain, Precise, Organic, Relative. It must be real: it must not deal with fancies and imaginations; no hypotheses of providential government of the universe, of social contract, of vital spirits, of chemical affinities, of electric fluids, and the like, must enter into it; it deals with methods and laws, not with metaphysical abstractions or theological entities. It must be useful: it must tend to the development of the intellect, only as the servant

of the heart ; with science, only as leading to action : mere antiquarianism, dilettanteism, study of detail not useful for explanation of general law or application to life, must be excluded. No grammatical pedantries or quasi-historical minutiae, no scholastic trifling of any kind can be allowed. It must be certain : mere conjecture, historical, philosophic, or theological, must be altogether relegated to the sphere of specialism : we have enough to occupy our short lives without that. It must be precise, that is, scientific. No science is complete until the phenomena included in it are capable of estimation, of being weighed and measured ; of being referred to some fixed standard, with greater or less exactitude, as we descend or ascend the scale in the hierarchy of the sciences, but always with sufficient exactitude for our practical ends. It must be organic : it must be definitely arranged on a truly philosophic scheme, in which each portion shall occupy a well-defined space in proportion to its importance. It must be relative : never introducing anything on the principle, which was once so popular, of knowledge for its own sake, but always for the sake of being able to foresee, and therefore to act prudently and well : knowledge not being the end, but the way to the end, namely, how to live for others, how to aid in the orderly progress of Humanity.

Such are the general requisites of all education, according to Comte. Probably the one which requires attention most at this present time is, that it should be organic : if we look into the time-tables of our schools and observe the utter want of any organic arrangement in them ; the undue preponderance given to some subjects, such as the study of dead languages ; the entire omission or comparative neglect of others, such as natural history or music ; the introduction of new subjects without regard to psychologic order—I do not mean of Comte's order, but of any order conceivable ; chemistry taught before mathematics or physics ; comparative grammar before any sound knowledge of one language has been attained ; history of literature before any acquaintance with the literature itself ; science before art, and so forth ; if we note how within the scope of each subject, no limits superior or inferior are acknowledged, beyond the incapacity of the pupil on the one hand and the amount of cramming that he will submit to on the other ; if we listen to the complaints of specialists that their subjects, physiology, philology, political economy, etc., are not taught sufficiently, if at all, in schools ; if we examine the

continual grumbings of schoolmasters published in educational periodicals to the effect that pupils are overworked through the vigorous scrambling among the masters for an extra bit of their time of study under the pressure of competitive examinations; we must, I think, conclude that this is one of the most crying evils of our present method—want of organization. It is for this reason that I shall devote my two next lectures to this subject—one for the third period of life, from 14 to 21; the other for the second, from 7 to 14.

For, I suppose, few will be inclined to assert that beyond these limits it is desirable to extend the period of education, properly so called. The extension of instruction beyond 21 is an abuse that has crept into our universities through the continually increasing pressure of competitive examination; this pressure being chiefly due to the exaggerated cultivation of classical pedantries (verbal criticism, Greek composition, and so forth), and of mathematical inutilities (in what is called the bookwork of much of the higher geometry, lunar theory, and similar matters)—these things being, at the most, interesting specialisms, not of *general* utility; on the other hand, before the age of 7, no education, properly so called, can be given with advantage. The instances of early precocity, whether of J. S. Mill, with poetry squeezed out of him; or of Dr. Watts, with theology crammed into him, do not tell in its favour. My own long experience as a schoolmaster is decidedly in favour of Comte's dictum, that even reading and writing should not be taught till the age of 7. Boys who have been left till then, as he recommends, to the training of a mother, and have done nothing but develop their senses and their feelings, overtake those of similar ability who have been taught in the usual way before they reach nine years, and thenceforth surpass them. Regular meals for mind, as for body, are an acquired habit, not an inherited instinct: it is as wrong to tie down infants in a kindergarten to such an anticipation of the mental dining-room, however nutritious the food may be, as it would be to insist on an infant's being suckled at fixed hours only. While the external world is so new, there are so many objects soliciting attention, that none can get it with any prolonged continuity. It is not till after many repeated trials and failures that a child learns to walk or speak. Still more trials and failures must be allowed it, before it can overcome such enormous difficulties as those

of reading and writing. The human race did not acquire these for many thousand years and the development of the child follows that of the race. It is enough if it learn to see, hear, and touch with accuracy, to love sincerely, and obey readily.

For it is during this early period that the most effective moral training is given. This cannot be given in school as it can by the mother. Nothing but the undue importance in education which we give to the intellect, as compared with morality, can have blinded us to this. Comte says, the weakening of self-love is the principal aim in early training. "It is only by teaching the child to do right in small things that he can be trained for the hard inward struggle that lies before him in life." And so R. Browning, who does not always agree with Comte, speaking by the risen Lazarus—

Should his child sicken unto death, why look
For scarce abatement of his cheerfulness,
Or pretermission of his daily craft :
While a word, gesture, glance, from that same child
At play, or in the school, or laid asleep,
Will start him to an agony of fear :
Exasperation just as like. Demand
The reason why : object, 'Tis but a word,
'A gesture' ; he regards thee as our Lord
Who lived there in the pyramid alone,
Lookt at us (dost thou mind ?) when being young
We both would unadvisedly recite
Some charm's beginning from that book of his,
Able to bid the sun throb wide, and burst
All into stars, as suns grown old are wont.
Thou and the child have each a veilalike
Thrown o'er your heads, from under which ye both
Stretch your blind hands and trifle with a match
Over a mine of Greek fire, did ye know.

As far as anyone can know, the mother knows this danger, and for the very reason that hers is not formal teaching, the child will learn from her, whom he trusts implicitly ; will learn from her the misery of selfishness and the blessedness of living for others. In matters of larger scope the teacher may replace the mother ; but in the little actions that seem not important, which no teacher can have time or probably interest enough to notice, the mother finds her opportunity, for it is precisely in these that it is easiest to appreciate the feelings that prompt them.

It is not possible within the limits of an hour's lecture to

give you all the general principles of education that have been laid down by Comte. Those already enunciated must be taken as a sample of the rest. It is greatly to be desired that some one should extract from his works all that bears upon this subject, and arrange it in a systematic form, more especially since that part of his last great work, the "Synthèse," which would have fully treated thereof, was not written. How valuable that treatment would have been in these times, I need hardly say : for in no region of thought is anarchy more perceptible than in this. With the exception of Mr. H. Spencer's work, portions of which are in complete accordance with Comte's views, and all of which is deserving of careful examination, I hardly know where to look for any complete or philosophical treatment of the subject. Empirical aphorisms, half truths pronounced *ex cathedra* in a dignified diction, but not founded on any complete philosophical basis, are indeed to be found everywhere ; but usually, discussion of minutiae of instructional methods, or platitudes derived from a theological or ethical no-method, take the place of a broad statement of the scientific laws which must precede any minor details of application. When such a statement is attempted, I do not find it attempted with much success. For example, it seems to be almost universally admitted that if anything is understood, it is the logical sequence of teaching. "This," says Professor Bain, "comprises the following distinct heads. First and most obvious of all, from the Simple to the Complex ; second, from the Particular to the General and Abstract. These two must be regarded as fundamental and almost exhaustive." Fundamental no doubt they are ; and not almost, but quite, exhaustive. In fact, each of them is exhaustive ; but seeing that one is merely the converse of the other, inasmuch as the Abstract is simple, while the Particular is complex, it is difficult to see how the direction to proceed in opposite directions along the same path can be of practical guidance in educational work.

I hope to show you that there is implicitly involved in Comte's system, though perhaps never explicitly stated, the solution of this difficulty. For it is a difficulty : there is no doubt that sometimes we have to adopt one order in teaching, sometimes the other, and that we ought definitely to separate the instances in which one order should be followed from those in which the other is desirable. But Professor Bain proceeds to enunciate "several important

aspects" of these sequences, "which deserve to be signalized as if they were distinct cases." Of these quasi-distinct cases the first is the sequence from the Indefinite to the Definite. This definite and distinct case has, however, so indefinite an aspect to the reader that it is found necessary to illustrate it by an example. "The pupil in astronomy is first told that the sun is at rest in the centre of the system, while the planets move round it in circles. At a later stage the circle is changed into an ellipse with the sun in one of its foci. Then the exact centre is shown to be the centre of gravity of the sun and all the planets." But this, so far as it is intelligible at all (it *is* hard to see what that "exact centre" means), is a history of the approximative hypotheses made by man in his endeavours to arrive at a true astronomical theory, and certainly not an example of a sequence from the Indefinite to the Definite, or, as Professor Bain also calls it, from the Unqualified to the Qualified. All the statements made to his astronomical pupil are equally definite, and in no sense can the substitution of one curve for another, or the change of centre into focus, be termed qualification. If this "important aspect" means anything, it cannot mean what Mr. Bain says it means. His next aspect is from the Empirical to the Rational or Scientific, which he acknowledges to be a mode of the transition from the Concrete to the Abstract, and which is also a mode (which he does not acknowledge) of the transition from the Particular to the General. The next aspect of the laws is: "In the Culture of the Power of Conceiving, the analytical order needs to be strictly followed." As I entirely fail to see how this can be an aspect of either of his fundamental contraries, I pass it without comment. The next aspect is: "We proceed from Outline to Details." This is no aspect of the primary laws, but a maxim of limited application in any case; moreover, in many demonstrably untrue. Finally, as a general rule: "We proceed from the Corporeal to the Incorporeal, from the Physical to the Mental." This is merely an enunciation of a portion of Comte's Order of the Hierarchy of the Sciences. We are finally left then with the two primary laws, which amount to this: That the order of the alphabet being fixed, we may read it forward from A to Z, or backward from Z to A; and that we may do which we like.

You may think that I am digressing from my professed subject in thus analysing the received doctrines of one of

the most celebrated educators ; but I cannot repeat too often, that this question of order is with Comte fundamental ; that next to the question of what to do, comes with him in what order to do it ; and that it is in this order that our practice is most irregular and unscientific. If no order be discoverable by which Education should be guided, if the acquisition of the Arts and Sciences may be arranged, as now, according to the individual caprice of any master, or any pupil, it is mere folly to attempt to lay down any principles of Education whatever. If on the other hand such an order be discoverable as Comte says has been discovered, it is time that it should be distinctly set forth, and that we should be released from the obligation laid on us by our present guides in this matter to believe in their two contradictory axioms, and afterwards to adopt in practical use either, neither, or both at our good pleasure. I conclude this lecture by urging you to study the condensed statement, given by Comte himself on Education generally, as quoted by Mr. Lewes, in pp. 16—17 of his excellent work on “Comte’s Philosophy of the Sciences.”

LECTURE II.

EDUCATION FROM 14 TO 21 YEARS OF AGE (SCIENTIFIC EDUCATION).

THE subject before us this evening is the course of Education which should be pursued between the ages of 14 and 21 ; in other words, if Comte's principles be true, the course of Scientific Education. Few persons, if any, will deny that such an education is desirable for all who are capable of receiving it ; and the universal experience of teachers confirms the choice made by Comte of the age of 14, as that at which the study of algebra and geometry should commence. If, then, his arrangement of the Sciences is the true one, there can be no doubt of the propriety of his general method, and criticism is reduced to the consideration of minor details. Is, then, Comte's classification of the Sciences correct ?—that is our first question. It will hardly be needful for me to consider it, however, inasmuch as no other linear classification has been proposed in its place ; and from the nature of education which is given in time, a linear classification is relatively to Education no option, but a necessity. Even, then, if such a system of classification as Mr. H. Spencer's were on philosophical grounds to be preferred to Comte's (which, by the way, I do not think it is), still for our present purpose it would be useless as not being linear, but arranged in three planes of stratification. Accordingly Mr. Spencer himself, in the exposition of his Philosophy, which required a linear arrangement as much as that of Education, is reduced to adopt, not his own, but Comte's order. Let us, then, see what that order is.

It will be well to point out, as a preliminary, that it is only the order, and not the grouping, that is essential in Comte's system. He himself varied the grouping continually, arranging the sciences in 2, 3, 5, 7 groups, etc., according to the nature of the subject in hand. The order of the Sciences he

never varied. Of all the arrangements which he proposed, that into the groups of Mathematics, Physics, Biology, Sociology, and Ethics, seems most suitable for our present purpose. It will also be necessary from the point of view which I adopt here to separate Psychology from Biology; and in so doing I am influenced not so much by the authority of Lewes, Spencer, and all the eminent writers who have found it advisable to do so, as by the conviction that it is for educational purposes more in accordance with Comte's own fundamental principles. I can well understand that he should reject the introspective ideology which assumed the place and functions of a scientific psychology founded on biology; but that he should include in one science mental and physiological phenomena, and at the same time assert that mind and matter were so distinct as to render any single or universally comprehensive law an impossibility, has always seemed to me an inextricable difficulty. Nevertheless, there will be nothing in what I shall now say that will be inconsistent with the view that Psychology is a portion of Biology temporarily dissociated from it for purposes of exposition.

These sciences, then, Mathematics, Physics, Biology, Psychology (whether considered as a part of Biology or as an independent science), Sociology, and Ethics, are to be taught in this course. Nor will there be any real difficulty in so doing, for I may remind you that it is not the present professional or specialist treatment that Comte wishes to be given, but such a *résumé* of the general laws which regulate each science as may suffice to show the bearings of each on each, and of each on the whole, and at the same time such a power of practical application of these laws as may enable us to assign any event in our experience to its proper position under them, so as to shape our future conduct accordingly. Let us examine in a little more detail what is included in this formidable enumeration. And first of Mathematics. We have in this subject the advantage of Comte's own scheme as laid down in the "Synthèse," and however much the advance of mathematical investigation may modify the details of that scheme, the primary divisions cannot be effaced, because they depend on those elementary ideas which lie at the foundation of all our knowledge. Thus, we have firstly Algebra (including the important subdivision of Arithmetic, which in practice, on account of its extent, receives a separate preliminary

treatment): Algebra, the Science of Number, or, as some prefer to express it, the Science of Time. Secondly, Geometry, the Science of Space, divisible into Plane and Solid. Thirdly, Co-ordinate Geometry (including Trigonometry), the science which unites the former two and may be termed the Science of Velocity. Fourthly, the Central Mathematical Science, which develops the idea of Acceleration; the Calculus, Differential and Integral—this science is equally applicable to the preceding and following groups, and serves as a bond between them. Fifthly, the Science of Kinetic, in which the idea of Matter or Mass is developed; in the preceding sciences we have to deal only with immaterial points, lines, etc., in this one the points have mass and are heavy as well as having position and movement. Sixthly, the Science of Static, in which the principle of Virtual Velocities—or, as I would rather call it, the principle of Energetic Moment—is shown to be the condition of equilibrium or rest. Seventhly, the Science of Dynamic, in which the principle of Vis Viva, or Conservation of Energy (not Persistence of Force, which would be quite a different thing, and does not exist in Nature), is developed, and which serves not only as an introduction to the next group of sciences, but also as the foundation for all our Material Philosophy whatsoever. In practice these three latter sciences are by Comte included in one course; but this is a matter of convenience merely, and relates to the number of lectures required rather than to the importance of the subjects. Before passing to the next group, I will recapitulate the elementary ideas on which this group of sciences is founded. They are: Number or Time (t), Space (s), Velocity ($\frac{ds}{dt}$), Acceleration ($\frac{d^2s}{dt^2}$), Mass (M), Virtual Velocity ($\sum Mv \frac{dv}{dt}$), Energy ($\sum Mv^2$). The discoveries made with regard to this last since the death of Comte must slightly affect his arrangement of the next group of physical sciences. In the treatment of them it has been found necessary to unite the theories of Light and Radiant Heat on account of the identity of their phenomena (Reflection, Polarisation, etc.). This has necessitated the division of Heat into two sciences. In like manner the science of Electricity has been separated into Static or Frictional Electricity, and Dynamic or Voltaic Electricity (Electricity in motion). Taking account of this, we have to consider the consecution of the group in a somewhat

modified form, and in doing this I must remind you that Comte was entirely opposed to finality in any shape, and that when he seems to be most dogmatic it is with a merely relative dogmatism, relative to its own time and its own circumstances. All men who have much to utter are accused of dogmatic finality, because they cannot stop to reiterate with every doctrine that it is to be taken as only relatively true, and that it is liable to be superseded, or rather to be absorbed, in wider generalisations in the future. Unfortunately, both partizans and opponents too often refuse to admit either these higher generalisations themselves, or the possibility of their having been considered admissible by the propounder of the lower ones. For my part I can only declare my belief that if Comte had thought that his scientific utterances were final he would have destroyed them rather than have published them. No one was more fully aware of the advantage to man in searching for, rather than in possessing, truth; no one less likely to erect a monument to scientific sagacity on the grave of that freedom of thought which he so consistently advocated.

The forms of energy then which we find existing in the universe, each one of which gives rise to a separate science, are: first, Gravitation, of which Astronomy in the sphere of the heavens, and Barology in the sphere of our own planet, are the developments. It must be noted, however, that much abstract matter, usually treated of under the head of Astronomy, really belongs to Kinetic; the misunderstanding of this point by men whose notion of astronomy is a telescope with a star at one end and an idiot at the other, has led to much foolish and unjust criticism. Secondly, Radiant Energy, following the laws of a transversely vibrating Elastic Medium: on this depend the sciences of Radiant Heat and Optics: the most characteristic property of this Energy is that so ill-named Polarization, the relation being really not that between two ends of a line or Poles, but between two planes which intersect along the line of propagation of Energy. Thirdly, Energy of Longitudinal Vibrations or Sound, the Science of Acoustics. Fourthly, Energy of Voltaic Electricity (including Magnetism), in which the idea of Polarity is fully developed. Fifthly, Energy of Heat—internal, not radiant. Sixthly, Energy of Static Electricity. Seventhly, Energy of Chemical Affinity, or combination of molecules of opposite attributes, closely

allied to Electrical or Polar phenomena. It will be noticed that in both these groups, Mathematical and Physical, we have not only well-defined boundaries to each group, but also well-defined subdivisions into separate sciences, which are generally admitted. It is possible that some persons might adopt a different order, but not that they should ignore the boundary. They might put Acoustic before Radiant Force, but they could not deny the line of demarcation even between Static and Dynamic Electricity. This arises from the fact that these being the earliest groups in the Scientific Hierarchy, are the first historically to develop into clearly defined forms. We shall find this far from being the case with the remaining groups. And this is important educationally, because in a Scientific Education such as we are now considering it is clear that only as far as the Sciences themselves have attained to a precise exposition can they enter into our scheme at all; and therefore the higher sciences, which are less developed, must receive a less prolonged attention. We shall see in the next lecture how this bears on the practice of life; we are concerned now only with scientific and intellectual training. With regard to the Biological group, it is certain that the old specialistic division into Sciences of Form and Function, Anatomy and Physiology, is becoming daily more discredited: the luminous exposition of Comte in his "Philosophy" has no doubt had great influence in this; it has also been found imperative to reduce the division between vegetable and animal life, between the sciences of Botany and Zoology, from its former supreme position to a subordinate one; yet no resolution of the group into subordinate sciences has as yet been admitted. Nevertheless, the functions with which the science is concerned seem to be distinctly marked, and to afford the basis for such a separation. The functions I mean are: first, Reproduction; secondly, Nutrition (including Digestion, Secretion, etc.); thirdly, Respiration of Gases, Nutrition being concerned with Solids and Liquids; fourthly, Circulation: this is chiefly an animal function, the three preceding being common to animals and vegetables: it is also the central function forming the connecting link between Respiration and Locomotion, which latter would indeed be impracticable in any complete sense without it; fifthly, Locomotion; sixthly, Sensation; seventhly, Nervation, the biological action of the nerves and brain. These last three are strictly animal

functions : one giving rise to a new subdivision, viz., the series of the senses ; the other closely connected with the next group of sciences, viz., Psychology. With regard to the Sense group, it has never been recognised as a distinct science at all, but has been claimed by the physiologists on the one hand and by the psychologists on the other. In fact, it forms the central or connecting nexus between Biology and Psychology, and therefore between the larger group still of Material or non-Human Science (Mathematics, Physics, and Biology), with Mental or Human Science (Psychology, Sociology, and Ethics). For as it is impossible on the one hand to consider Mind or any science involving mind as its subject matter without considering the origin of our ideas through Sensation, so is it equally impossible to consider the biological phenomena of the higher animals other than man himself without taking into account the fact they too have senses, sense organs, ideas and idea organs, brains, ganglia, and so forth. This intimate connection justifies Comte for the purposes of his exposition in uniting Biology and Psychology in one central science—just as at other times he united Mathematics and Physics, or Ethics and Sociology. Nevertheless, by separating them the analytic separation of the Science of Man and the Science of Nature is more fully brought out—just as the ultimate synthesis or identity of these can only be realised by their union. With regard to the Senses themselves, however, we must increase the usual number of five to seven at least, if not to eight, as Comte proposes. For we have : firstly, the skin sense of Touch, which distinguishes Heat and Cold ; secondly, the tongue sense of Taste, which distinguishes Flavours of Liquids, and appears to be closely connected with Electric Action, and with the function of Assimilation ; thirdly, the nose sense of Smell, which distinguishes odours of Gases, and is connected with Chemical Action, and the functions of Respiration ; fourthly, the Sense of Dynamic Electricity or Nerve sense, which, as Comte says, is not directly developed in Man to a great extent, but which seems to me to be closely bound up with, if not identical with, the sense of Pain, as in toothache, for example ; fifthly, the Muscular sense, by which we appreciate Weight or Resistance, connected with Gravitation and the function of Locomotion ; sixthly, the eye sense of Sight, connected with the Science of Optics ; and seventhly, the ear sense of Hearing, connected with Acoustics.

Some of the subordinate sciences in the psychologic group have been pretty generally recognised ; others not so. The first of them, that of Perception, in some treatises absorbs a very large share of the whole exposition. The second, that of Memory, has recently received a full, separate scientific treatment. The third, that of Deduction, or formal Logic, has long been acknowledged to be a separate science, and to require special separate development. The fourth, that of Emotion, has been handled apart from the rest of this group, *e.g.*, by Professor Bain. The fifth, that of Abstraction, has also received its just due at the hands of the logicians. The sixth, that of Imagination, has been recognised since the time of Aristotle. The seventh, that of Induction, has been worked out largely by J. S. Mill and others. Nevertheless, these sciences, however elaborately some of them have been developed, are far from attaining the organization of the earlier physical groups, and they may be regarded as forming a development of the last member of the biologic group, just as the physical group may be regarded as a development of Dynamics, the last member of the group of mathematical sciences. With regard to the sociological group, the great achievement of Comte in recognizing and partly creating it has not even yet sufficiently developed to allow the separate sciences contained in it to attain an independent existence. Only one very imperfect attempt—that of the Political Economists—may be said to be really organized at all. Nevertheless, it seems to me that seven subordinated sciences will be required. Firstly, that concerning the Spiritual Power, the Clergy, the Educators—I care not by what name you designate it, provided its existence be acknowledged. The organization, functions, growth, diseases, etc., of this part of the social organism require a scientific treatment as much as the brain does in biology. Secondly, that of the Civil Power, the Arbitrators of Justice, the Judges, Lawyers, etc. Thirdly, that of the Fine Arts, the Poets, Painters, Sculptors, Architects, etc. ; but especially of the Poets. These three classes lay up for us mental wealth : wealth of art, wealth of law and history, wealth of moral sentiment, which is handed down from generation to generation, more surely perhaps than material possessions : but this wealth being mental, its products not being amenable to the same tests and measurements as material wealth, they are too often looked on as having no value. It is true

that some material products of these classes have been included in Political Economy, along with material wealth; but only with regard to scarce or plentiful supply, as in the case of rare books or coins, or the like, with the result that products most intrinsically worthless are often from that point of view the most valuable; but a unit of measurement is needed totally different from a material one, and hints for the development of the whole subject, too large to pursue here, will be found in abundance in Comte's later writings.

Between the sciences which concern mental wealth or wealth and those which concern health and material possession comes the science which unites the two groups, viz.: that of Distribution, at present regarded as a part of Political Economy, and hence utterly failing in exposition, as neglecting altogether the relations between the distribution of material and that of mental wealth. So long as the Political Economist refuses to recognize any capital but what is material, any payment but what is material, so long from his own point of view he will be demonstrably illogical. As long as he regards accumulated skill, accumulated knowledge, as not being capital, just as much as accumulated money or land or houses, so long his laws of distribution will only be applicable to the few cases where knowledge, skill, honesty, and morality do not enter as factors, and will not without large allowances justify practical conclusions; unless, indeed, we adopt the doctrine in questions between ourselves and others as individuals that some Christians are not ashamed to advocate for adoption between ourselves and others as nations.

The fifth sociological science is that of Health-organisms, of Doctors and Medical Officers of all kinds, their functions, their organization, their relations to the rest of the community, and so forth. The sixth is that of Manufacture, of Capitalists and their duties, etc. The seventh and last, that of Labour, of Artizans, their wages, their duties, their organizations and the like. These two latter sciences, together with an imperfect and narrow view of Distribution, as confined to material wealth, constitute nearly all of what is understood by Political Economy; and the fact that this was the earliest portion of Social Science to historically attain any organized development, shews that in Education the order should be the reverse of that which I have now adopted in exposition. We should begin with the production of material wealth,

and end with the communication of mental, which leads us directly to Ethics, or the last group of the Sciences. But before passing to this, I would strongly recommend the perusal, on questions of Political Economy, of the "Plutology" of Mr. Donisthorpe, a quondam pupil of mine, especially on the question of what the Economists mean, or do not mean, by the technical language they make use of, and for a statement of the limitations within which their works must be used.

Ethics, which has hardly as yet taken its proper status as a science, will in its complete form resolve itself into seven divisions. Firstly, Duties towards Members of the Family; secondly, towards Nations; thirdly, towards the Race of Man; fourthly, towards Domestics, whether human or animal, and reciprocally; this is the connecting science between the former group of those which concern the duties of man to man, and the later group, which concerns the duties of Man in relation to his environment, viz. : fifthly, to the rest of the animal world, sixthly, in relation to property; and seventhly in regard to the universe as a whole—in other words, his Religion, on which it would be most unfit for me to say anything here: that must be left for those who are able to adopt the religious views of the founder of that philosophy with which alone I am now concerned. I may, however, point out that the unit of Ethical Society is the individual man; while, as Comte has so luminously shown, the unit of Political Society is the family, consisting at least of the married couple. In the same way, the unit in Mathematics (including Mechanics) is the atomic point; but in Physics it is the molecule or double atom; in the central Biologic-Psychologic sciences, it is the cell for Biology, for Ethnology the Tribe or City. But this examination of the sciences is already too long. I must not continue it further. I have been in some measure compelled to go through it now, because without it it would not be possible to avoid great confusion in stating the order which Scientific Education must take if Comte's principles are to be carried out, and also to clearly bring before you the extent of the curriculum which he holds to be absolutely essential for the complete education of a man or woman. Now, notice this: that it is not possible for all men to be completely educated; many men are incapable of scientific training at all; there are artists who cannot understand the chemical constitution of their own pigments, and poets to whom an algebraic equa-

tion must ever remain a mystery. We have also political advisers who have never investigated either the smaller problems of exchange that have been worked out by the Economists, or the mental laws on which Social Science must be founded. We are not, however, to conclude that these men are inferior, because they are not complete: they may be superior. Shakespeare was not profound in science of any kind, and Charlemagne was no Aristotle. Nevertheless it is desirable, if practicable, to attain completeness; that is, if shallowness can be avoided. For all, then, who have energy enough and time enough, Comte desires this universal Scientific Education. But, palpably, it cannot be given, if by Chemistry, for instance, we are to understand the special professional kind of teaching introduced under that name into our schools and colleges. A lifetime would not be too much for one science to be so learned. But there is ample time, in the seven years allowed by Comte for scientific education, to thoroughly master all the leading laws, all the fundamental principles in all these sciences, and to exercise one's self amply in their practical application; that is to say, sufficiently for the cultivation of one's own intellect, and for use in all cases except of such emergencies as require the aid of skill only to be attained by the special training of a life pursuit.

Of course the specialists deny this; the usual cry is that breadth implies shallowness, and we cannot answer this by an appeal to our own experience without laying ourselves open to the charge of self-conceit; or to the examples of such men as Comte and Aristotle, without being met by the objection that these are rare exceptions; and in my own belief there is but one way to refute our opponents, which is by instituting a system of scientific educational lectures on Comte's basis, and so proving the possibility of his system by carrying it into execution. Until this is once done, progress in public opinion on this matter will be very slow; but when once done, it will be correspondingly rapid. Unfortunately the greater part of the present educational activity has not been a healthy and spontaneous growth, but is of the hot-house and forcing-bed, promoted by artificial means and for artificial ends; many failures will be needed to lead us back to the straight path. Thus we find, on the one hand the scientific specialists continually urging us to introduce their special sciences into education—the physicist is never weary of urging the claims of Physics, the

chemist of Chemistry, the biologist of Biology; on the other hand, the schoolmasters and teachers generally are willing to admit only one or at most two sciences into their curriculum, on the plea that the mental training which can be obtained from any natural science can be got equally well from the study of language, and that if, beyond this, any education of the senses be desirable, if experiment, or classification, or observation, be of educational utility, then some one science such as Chemistry will, they urge, be found amply sufficient. But both specialists and teachers err alike from narrowness of view induced by their own daily avocations. And Comte is unwearied in reiterating the need of inculcating the general principles of *all* the Sciences in a complete scheme of Education. Practical command of the chief modern languages he insists on, as a means of access to the treasures of art and science stored up in the greatest writers; special study of Greek, Latin, Sanscrit, and so forth he values highly as a special pursuit; the Science of Comparative Philology of course takes its proper place, as a subordinate branch of the concrete division of Psychology; but he, and in this Mr. H. Spencer follows him, has entirely exploded the notion that any satisfactory view of the Universe, any clear idea of the relation of Man to the world he lives in, any sound basis for moral and social duty, can be found in one-sided or specialistic training. At the age of 21 the completely educated man ought to be on a level with the Science of his time, in all its branches, so far as these have attained such clearness as to be set forth in general laws; he is then fit to enter on that course of special or technical training which shall eventuate in his final choice of a destination at the age of 28. This training is, however, to be obtained by the actual practice of the art or profession chosen, and is not to be given in a method imposed by others, although special help may of course be obtained from others by lectures or demonstrations in an eclectic way. We are not concerned with it here further than this: To protest against the statement that Comte neglects all technical training in his anxiety to favour philosophy, and to show that all the scientific culture of the seven years, from 14 to 21, is merely regarded by him as an introduction to the application to be made of it—the art, the practical or applied science, which immediately follows it; science, the basis of conduct, under the guidance of duty.

It is indeed one of the disadvantages of specialist treatment that we here encounter, even in this exposition. It is not possible to expound Comte's method of Education apart from his general scheme of Philosophy and Polity, and I find myself every now and then assuming a knowledge of your parts or portions of that scheme of which it is possible that some of you may be ignorant. It may not, then, be out of place here to repeat that after the age of 28, at which the development of the individual is complete, he is in Comte's view to be regarded as devoted to the service of Humanity; whether as actively exercising his own pursuit, or as making discoveries which shall facilitate such application, he is always the minister to the needs of his fellow men, and all his duties are to be regarded from that centre. It is then solely with regard to preparation for this service to Humanity that we must consider the technical training from 21 to 28, and it is as a foundation of this technical training that we must regard the Scientific Education from 14 to 21. It consists mainly in deductive reasoning. Not until after practical experience of the realities of life, its prosperities and adversities, say between 40 and 50, does a man develop his full power of invention, of originality, of inductive reason; during the early period we are now considering, accuracy and faithfulness of work are more essential than novelty or brilliancy. In fact, the premature endeavour after originality which is fostered by prize essays and the like, is a serious mistake, injurious to the development of reason, and of feeling also. It is, therefore, absolutely necessary that a sufficiently extended view of the universe be taken to prevent the adoption of a crude, unfounded hypothesis on the one hand, or the endeavours after a specious originality on the other. Nor can I see how these results are to be obtained by other means, when we consider the numerous cases in our time of men highly eminent in some special science or art—mathematicians, chemists, biologists, poets, and painters—adopting the most puerile beliefs, and deceived by the most imbecile of charlatans, in the tricks of mesmerism and table-turning. It will I think be evident that the only defect in common to all these eminent men is that of a want of generality in their scientific training.

It is on account of this almost universal deficiency that I have occupied so large a portion of this lecture with an analysis of the classification of the sciences: there is no

part of Comte's philosophy which is more certain or more important than this insistence on general culture; there is also no part which is more generally opposed, or when not opposed, neglected. It, therefore, becomes necessary to shew exactly what he meant in requiring a universal Scientific Education, and that he desired nothing impossible or absurd.

With regard to the *order* of teaching the Sciences, it is quite unnecessary to add anything to the arguments on which Comte founded his philosophic Hierarchy of the Sciences. They have been openly and tacitly admitted by all, by his adherents and opponents alike, and have now for many years been practically the basis on which all systematic treatment of Science as a whole has been founded. It may be desirable, nevertheless, to point out that this order of his is the order from the Abstract to the Concrete; from Matter to Mind; from the World to Man; from the Simple to the Complex; and that this order must be kept in every part and division of Scientific Education, as well as in the great primary classification itself. This is not generally recognised; it is not unfrequent for physiologists, for instance, to begin an explanation of the circulation of the blood by an ocular demonstration on the heart of a sheep or bullock. This is a mistake; the first explanation should be from an abstract diagram (not a picture), and the actual facts should then be pointed out in the concrete. So chemists begin with teaching a number of isolated facts about the gases, hydrogen, oxygen, chlorine, etc., and only gradually get to the enunciation of the general theory of equivalents—a similar mistake. The general theory ought to be the starting point for scientific treatment. It is not desirable that young minds should travel through all the thorny inductive paths by which their ancestors attained the position we now hold. And yet few things are more important—scarcely anything is more insisted on by Comte—than the necessity of constant historical reference in scientific teaching, and the wrongfulness of not paying due honour to the discoverers of scientific truth, by continually connecting their names with their discoveries. There is, however, no contradiction involved in this. The historical references in scientific teaching occur in an inverse order of time: they begin at the known present, and extend backwards until they reach the dim, misty ages of which the records are written, not on paper, parchment, clay-brick, or

chiselled rock, but in the very treasury of the earth itself, in the flint weapons, the shell heaps, the lake dwellings preserved therein. This backward teaching of history is very valuable—it fixes our eyes on the long journey Man has passed through; impresses us with the comparative littleness of the few steps we have made ourselves; and encourages us with the hope of a future for our posterity greater and better than this present, even as the present transcends the past. If any one should think, however, that I have misunderstood Comte, and that he advocates merely a historical teaching of the Sciences, such as that sometimes adopted in Astronomy, I refer them to the examples of scientific teaching left by Comte himself in his “Co-ordinate Geometry,” and the mathematical course of the “Synthèse.” It will be found there that although he is careful to refer to the discoverer of anything important therein, yet the general arrangement is not historical, but systematic; and that whatever historical sequence may be apparent, arises not from the conscious adoption of historical order, but from the necessary correlation of the historic development of a science with its position in the hierarchic classification. It is specially necessary to distinguish the method in these strictly educational works from that of the “Philosophie Positive.” The former is deductive, addressed to the young mind in process of training; the latter, partly inductive, introducing original discoveries—partly deductive, showing the results to be obtained therefrom, but in no case to be taken as a model of style or method, as the educational works were meant to be.

It is in strict accordance with this principle of order that Comte (whom I am now, in this respect, trying to imitate) appears to have acted in laying down the theory of Education itself. He sets before us his plan for a perfect system, and then leaves us to make such allowances and alterations for immediate practice as our present environment compels. Of course, this is met by the cry, “How unpractical all this is!” Teachers cannot be got to work on such a system; pupils have to give up education altogether long before the age to which this plan would occupy them; mothers are not themselves educated sufficiently to prepare their children in the earlier stages; fathers—but it is needless to go on with the enumeration. It is unfortunately too true that we are not perfect, that we are far from perfect, and that our surroundings are also far from perfect. Nevertheless, it behoves us to keep perfection in view. The mechanician never gets

rid of friction, but he makes calculations on the hypothesis that no friction exists, and gets as close as he can to them in his practical results. The doctor does not get chemically pure drugs, but he gets them as nearly so as he can, and allows for the slight impurities in his prescription. But these are practical people. The astronomer, engineer, electrician, are practical people, yet they all act on the same principle, form a perfect theory, and get as near it as they can by successive approximations in practice. It is in social subjects, and in this one of education particularly, that we are asked to believe that the error is more important than the original plan, that the deviation caused by the attraction of a planet is of greater consequence than the ellipse described round the central sun. It is a matter that will not bear arguing; no minor deficiencies that are to be ultimately minimised or eliminated can possibly enter into our primary theory in this matter. The practical guide for conduct will be found in the words of One whom Positivists sometimes more closely imitate than his own followers: "Be ye perfect, even as your Father which is in heaven is perfect."

Comte's answer to this charge of want of practicality is complete. Provide the Education, and daily the number of those who can and will take advantage of it will increase. And, I venture to repeat, that until this great step is taken, until this education be provided, not merely is it impossible for Positivism to largely spread, but it is impossible for it to be fairly and practically judged. The code of Positivist principles is, as far as Comte laid it down himself, accessible to whoever cares to investigate it. The nature of the political and moral principles of Positivism has been, and is continually, brought before public notice in various ways, and is exercising its power in modifying public opinion; but until a Positivist education is obtainable by any one who desires it, so long the movement, whether philosophical or political, is infantile and undeveloped. This is even more necessary in England than it is in France. This country, which prides itself on its practicality, by which it means its freedom from guidance by either rash hypothesis or wise philosophy, will go on accepting theory and practice alike at the hands of the present educationalists—Theory: That the business of Education is to harmoniously develop all the faculties of man; Practice: That this is best done by narrowing and specialising, by insisting on orthodox views on spelling in Government Board schools, and orthodox views on

Greek particles in endowed schools—until something better is put before them. Directly this is done they will seize on it eagerly. It is of little use to talk here or elsewhere on the theory of Education; Comte himself would not by so doing have effected much in England; but if his admirable teaching were practically reproduced, as with his example it ought to be, then the most important effects would speedily follow.

With regard to the manner of teaching, little need be said. Every good teacher forms his own style, just as every writer or painter or architect does. It is as absurd to suppose that uniformity of method is attainable or even desirable in teaching, as it would be to expect that every poet should form his verses on the same model. On the contrary, in the exercise of any art, the idiosyncrasy of the real artist is and ought to be distinctly visible. The peculiar touch of Turner or Rembrandt is as marked as the form of metrical lines is in Fletcher or Shakespeare, or the manner of exposition in Tyndal or Huxley. The only thing that one can do to form one's own style in writing is to study continually the works of the great writers; in painting, as the older painters did, to frequent and work in the studios of the great masters; in teaching, to listen to the lectures of the great teachers; and, having done this, to give free scope to one's own natural powers, whatever they may be. The extent and order of the subject matter is settled for us by philosophical and psychological laws; but the manner or method depends on the power of the teacher both in extent and direction. A great part of the so-called normal work in our training colleges, a still greater part of the influence of many school inspectors, tends to produce, not the manly independence characteristic of the real artist, who knows his work and knows that he can do it, but the conceited priggishness of the sciolist, who despises every method outside the narrow school within which he bounds his universe. With him his method is good just as his creed is—not because it represents his own convictions, or is the outcome of his own experience, but because he has been taught it by rote, and finds it easier to follow others mechanically than to exercise thought or energy in developing himself.

I would also have you note, how nearly all that is good in our present system has developed spontaneously; while nearly all that is bad has been the result of external, too often of governmental, interference. The education given

as late as the seventeenth century was not unsuited to the needs of its own time. The classical languages were required for international intercourse, and as the entrance to the grandest literatures then existing. The claims of Mathematics, the only science then fully organised, were fully recognised; History and Geography were not neglected; the Fine Arts held their due place; the only important defect was that Education was confined to a small number. Moreover, even to a much later period, all advances in Science, in Mathematics, Mechanics, Astronomy, Light, Heat, Acoustics, were properly incorporated in the teaching of the Universities. It was not until the rapid advances made by Chemistry and Biology rendered it impossible to include them in the same course with the sciences already acknowledged without dismissing some of the time-honoured specialisms in Mathematics or abandoning the absurd system of cramming still in vogue under the name of book-work, that any real difficulty was felt. But, meanwhile, two serious hindrances to educational progress had become established. One was the vast amount of importance attributed to verbal scholarship. Verbal criticism was important when classical texts were first discovered, for to it we owe the power we now have of reading many masterpieces of literature in an intelligible form. It is still important, as the shamefully erroneous texts of our own poets, whether the older ones, Chaucer and Shakespeare for example, or the more recent, as Shelley, may abundantly testify; but it is a specialism that ought never to have assumed a place in general education. The other hindrance was the power of the dead hand as evinced in the stereotyped teaching of our grammar schools in accordance with the founders' wills. Parents might remonstrate and claim instruction in modern languages, in Chemistry, or other science: It is not so specified in the will, was all the answer they could get. Masters might desire to break the chains that bound them, but all the University honours were assigned to the old subjects, and on the attainment of these the very existence of the less highly endowed schools depended. Trustees appointed the masters who could write the best iambics or Ciceronian Latin (unless, indeed, they had some friend or relation suitable to the post), and what these men knew they taught. It is true that the Education Commissioners have now altered all this. They have, at a great expense, sometimes amounting to no small proportion of

the total endowment, introduced new fixed schemes of their own, which are perhaps as suitable to our times as the original founders' wills were to theirs ; but they have only substituted one dead hand for another—in a generation or two their schemes will be as obsolete as the founders' wills are now, and the work will have to be done over again.

When I say, however, that the Commissioners' schemes may be as suitable to our times as the original founders' wills were to theirs, I mean only with regard to the subjects taught, and by no means with regard to the recipients of the teaching. For the founders almost always appointed their schools for the poor ; the Commissioners invariably escheat them to the rich. Now, in Comte's system nothing is more emphatically laid down than that no aid in money is to be given from any funds, over which the political government has power, to any education whatever, beyond the primary teaching of reading and writing. He fully saw the mischief that must ensue from attributing spiritual power to political authority. Neither did he believe in that monstrous delusion of our time—the system of inspection—so closely bound up with payment by results. He would not allow in his theory a plan which implies that we can obtain an incorruptible body of inspectors, but can obtain only a corrupt body of schoolmasters ; a plan which logically would require another body of inspectors to the second power to inspect the first, and so on for ever, inverting the old adage : " A body of wrong doings, with other wrongs to right'em, Righted again by other wrongs, and so *ad infinitum*."

A system, moreover, which, having grossly failed in securing properly built houses, preventing adulteration, or abolishing sanitary nuisances, could hardly be expected to succeed in the most delicate and ideal of the arts, which has to do with more subtle matters than Mechanism, Chemistry, or Medicine. This system destroys the self-respect and enthusiasm of the teacher, the reverence of the pupil to the master, all individuality and progress in the method adopted ; it creates a servile and martinet spirit in every rank of its hierarchy, and the only advantage of its adoption is that the utter collapse of the present costly experiments, which must ensue, will pave the way, as nothing else would, for the conviction, that the spiritual and political powers must be separated, and that only on such a basis as Comte's can a National Education be truly organised. It depends on Positivists to show that their scheme is ready for adoption when the crisis comes.

LECTURE III.

ON EDUCATION FROM 7 TO 14 YEARS OF AGE (ARTISTIC EDUCATION).

I HAVE kept for my last lecture the consideration of Education between the ages of 7 and 14, somewhat against the natural order of treatment, because it is in this period that Comte's system is most directly opposed to our practice and our prejudices. We are so accustomed to regard a boy's school life as one continuous development, to be guided on the same plan throughout, that the proposition to make a sudden change just in the middle of it jars unpleasantly with our habitual action, and still more with our habitual thought. Nevertheless, this change is the keystone of his method, and without it the rest of his plans are unintelligible. Nor is it so opposed to present practice as it seems; we do really make a great part of the change he desires already, for at or about 14 we introduce abstract scientific teaching, Geometry or Algebra, just when Comte would have us. But, unfortunately, we do this unconsciously. If you inquire of any average teacher when he introduces science into his curriculum, he will assure you that he does so much earlier than at 14, perhaps even as early as 7. If you further inquire into details, you will find that the "science" spoken of is Grammar, or Natural History, or Classificatory Botany, or Chemical Experimenting, or Object Lessons; but in any case something quite different from the scientific course spoken of in my last lecture.

It is the pre-eminent merit of Comte, in this subject of Education, to have clearly laid down the distinction between Abstract and Concrete Science. In the former, as we have seen, the educational order is from the Abstract to the Concrete, from the Simple to the Complex. In the latter the order is reversed, we pass from the Multifold, Complex, Concrete, to the Single, Simple, Abstract, and this order is always the order in which our interest is excited, although

the other is that which allows of the simplest exposition. We care for and feel interest in acquiring knowledge about our relations, our countrymen, foreign races, animals, plants, machines, long before we know or wish to know anything about abstract science in general, or any one of the abstract sciences. We must, in fact, accumulate the materials on which science is founded, before we can have a science at all. This was the course of the development of the race, and it is not unusual even now to meet with abortive specimens of humanity who never develop beyond this earlier stage, who live and die without desire for any complete scientific culture.

But although Comte clearly laid down the distinction between Abstract and Concrete or Applied Science, he has not left us any detailed doctrine, either on the order to be pursued in the stage of Education now under our consideration, or on the subject matter of which it should consist. It is my object to endeavour to supply some of the details which he would have probably given us had he completed his treatment of this great subject. In the first place I lay down the maxim that the subject matter for this period of education must consist exclusively of Concrete Science in form of a History, or Applied Science in form of an Art. Secondly, the order of teaching must be the converse of that adopted in Abstract Science; this order being determined, not by considerations of simplicity, but by those of the interest or pleasure which can be excited in the pupil. The pupil during this stage is merely an individual to be completely cultured, it is not till the next stage that the direct preparation for the service of Humanity begins. Now the order of Interest follows that of nearest environment. The infant cares for and about its mother, father, brothers, and sisters, before it feels any interest in other human beings. The child has interest in people of its own nation before foreigners; in men before animals or plants; in animals before machines. In other words, the order of phenomena interesting to the child follows that of the successively enlarging environment of Family, Nation, Race, Animal and Vegetable Kingdoms, the Earth-planet, the Universe. But there is this marked difference between this order and that of Abstract Science: that in the latter each science has to be treated in linear order, appealing to and utilising previous sciences, but still essentially distinct in treatment. Nothing discursive, no side excursions are admissible.

But in the former, as the area of environment increases, the previous territory is not to be given up; the expansion is not linear, but from a centre, and embraces a continually enlarging circle, so that it becomes desirable not to give over any field of instruction during this period, but only to gradually lessen the time devoted to the subjects introduced at first.

It is at this point that we are struck with the insight into human nature shown by Comte in his doctrine that children during this stage should be taught at home by their mothers. The patience, the attention to details, the treatment of each pupil as a separate individuality, not merely as a member of a class, requisite at this stage, are much more often found in women than in men; just as the breadth of view, accurate reasoning, absence of discursiveness, requisite in the scientific training, are more often found in men. It will be generations hence before mothers will, as a body, be fitted to perform their work as educators; but, in the meantime, a great step would be taken if the teaching of all young children were committed to women. The recorded experience of teachers in ragged schools, Sunday schools, and other cases, in which women's teaching has been tried, will be found to confirm this.

We have next to examine in greater detail into the subject matter of this stage of Education. Our starting point will be, of course, the classification of the sciences in the preceding lecture; to each scientific group we shall have to assign the corresponding groups of Concrete Science or History, and of Applied Science or Art.

To Ethical Science, then, are correlated the Arts of Courtesy and Education, and the History of Moral and Religious Beliefs embodied in the mythologies of all races. Almost without exception are the best educators agreed that the natural pabulum of the young mind will be found in these, whether in the sacred books of various religions, or in the mutilated and altered versions of older myths as in fairy tales, or in the myths themselves in a less altered state as we find them in Greek and Indian literature. In spite of the continual attacks of moralists and scientists on the indecencies and improprieties of the Greek myths, they have still kept their ground in the teaching of the young. An instinct stronger and truer than any deduction from formal rules of Ethics has always been felt that these indecencies were merely superficial, arising from the translation of phy-

sical phenomena into social language. And, practically, I do not believe that any coarseness or impropriety (or what seems so to us) in Homer, in the Ramayana, in the Nibelungen, in Roland, in Arthur, in the Rig Veda, in the Bible, has ever had any corrupting influence of perceptible account on any modern boy or girl. The corrupting books are not the outspoken ones, but the indecently veiled ones; the Tom Moores and Eugene Sues, not the Shakespeares and Balzacs. I venture on this apparent digression as a protest against well-meant but ill-succeeding attempts at Bowdlerising, or otherwise trimming these old traditions. Such pruning may kill; and if not, it draws attention to the ugly scar where a branch has been cut off, and too often leads to a minute dissection of the severed limb, which in its natural position might have escaped notice altogether.

Connected with Sociology are the Art of Government, including Legislation, Diplomacy, Arbitration, or Administration of Justice, etc., and the Concrete Science of History, *i.e.*, the History of Nations. With regard to the arts of Education and Government, they do not come within the scope of my present purpose. Before the age of 7 the mother will have taught by precept, but still more by example, the arts of courtesy and deportment, so far as the child needs them, especially the main educational principle of self-control and living for others. She will also have taught all that is required respecting obedience to the law and the duties we owe to society, so far as these are explicable without reference to sociologic science. History, on the other hand, is the immediate successor to Mythology, and although its study should begin so early it should not cease till the scientific course is entered on at 14. From the mythologies of India and Greece it should lead down through the histories of Greece, Rome, and Europe, with, of course, special reference to our own country, to the present day. It is in this concrete science of history, this dynamical division of social science, that Comte's laws will be found invaluable to the teachers: the pupil will not comprehend them fully until after the teaching of the abstract Science of Sociology, when he will be prepared to sum up the less co-ordinated (but not, therefore, merely desultory), teaching in this earlier concrete stage; nevertheless, they ought to be constantly appealed to and kept well in sight along the whole course. I allude, of course, to the celebrated law of the Three Stages of Mental Evolution—Theological, Metaphysical, Positive; to his no less important sequence of Offensive War, Defen-

sive War, Industrialism ; to his series of theological beliefs—Fetishism, Polytheism, Monotheism.

It may be worth while here to call attention to the fact that the two great sociological laws of Comte exactly correspond with the sixfold division of the Sciences, as given in my table. Thus, if we take the first law of Stages, Theological, Metaphysical, and Scientific, these are correlative with the even members of my abstract series, Ethics, Psychology, and Physics. If we take the second law—Offensive War, Defensive War (with which agricultural pursuits are associated), Industrialism : these are correlative with the odd members of my Concrete series—Law, Medicine, and Mechanism. Thus the relation of Comte's two series to the Hierarchy of the Sciences in order of value, and to each other in order of historical development, will be brought out more fully than was previously possible. Again, if we combine Comte's two series into one, for the purpose of showing their time-order in history, thus—Theological, Military, Metaphysical, Agricultural, Positive or Scientific, and Industrial, we are at once struck by the fact that the last three stages are stable and abiding ; while the first three are provisional and transitory : Theology ultimately merging in Ethics, War in Arbitration, Metaphysics in Psychology. All this and many more developments of Comte's laws, which I have not time to lay before you now, but which are most necessary for the full understanding of the admirable sketch of Comte's Sociology, in the two last volumes of his "Philosophy," should be earnestly and diligently meditated on by educators.

Attention should especially be drawn to this last law which I have mentioned ; it is as yet insufficiently recognised. I call it the law of Homologous Replacement, like that of gills by lungs in natural history. When this law shall have been fully worked out, I believe it will be found much more extensive than is usually supposed. Thus, the function of a supernatural system of cabala and charms has been practically replaced by Mathematics ; astrology has been replaced by Astronomy ; alchemy by Chemistry ; sorcery and magic have been replaced by Sanitation ; sacrifice by Dissection, some of its worst features still remaining in scientific vivisection ; metaphysics have been replaced by Science, just as contemplative mysticism has been by practical Art ; theology by practical Ethics, and finally, war is now being superseded by Arbitration :

in all these cases the supersession or replacement not taking effect by a violent displacement, but by a gradual absorption.

I must also notice here, on account of its practical importance, a heresy that has recently grown up as to the teaching of History. It is held that the true method is to ascend the time stream, beginning at our own days, and with familiar phenomena, so as to proceed from the known to the unknown. This is only another form of a fallacy I have had to expose before—a mistaken application of the central doctrine of the passage from Concrete to Abstract. It is assumed that the political and social events of the present time are familiar to the child, and that they are of easier comprehension to him than those of antiquity. No doubt for an adult this would be true: for the child it is not true. The educationalist of this time seems to be always making this mistake. From the teaching of Arithmetic (*see* De Morgan and Sonnenschein) to that of Sociology, there is the same incapacity to sympathise with the child as an incompletely developed being; the same assumption that adults and children requiring instruction on the same subjects ought to be taught in the same way. Nothing can be more false. The child has to go through in an abridged form the experiences of his race. He begins with the fetish stage, but by the age of 7, when we take him up, he has got to the polytheistic stage and is immersed in myths and fairy tales. He is prepared for the stories of the Persians and Greeks, for the Gauls and Romans; but not for the complexities of modern civilization. The man who has been trained by experience, if not by science, in the multifarious phenomena of commerce, of politics, of international intercourse, etc., does, on the other hand, often work backwards in his historical studies with great advantage. A striking instance of this, hitherto not noticed, may be found in the novels of Sir W. Scott. At the risk of appearing to digress from the subject before us, I will go into some detail on this point, because these historical studies of Scott appear to admirably illustrate the order in which not only political but natural history should be studied, not at this period of education, but by adults; and I cannot refer you to any treatment of the subject in books. Indeed, the subjective order of study of any of the great writers has only been empirically, not philosophically, carried out. The novels of Scott fall at once into two great

classes, according to the relative preponderance of Scotch or English interest in them. This of course has been often noted, but not so the fact, that with this division of nationality coincides a division of time: the epochs treated of in the Scotch novels being subsequent in date to 1650; those in the English anterior; between them the whole body of novels covers about six centuries, from 1200 to 1800. Scott began the series with "Waverley," "Guy Mannering," and "The Antiquary," which cover the latter half of the 18th century. He then wrote "Old Mortality," "The Black Dwarf," "Rob Roy," and "The Heart of Mid-Lothian," which, beginning about 1680, bring us down to the time at which "Waverley" started in the first group. In the next group, "The Legend of Montrose," and "The Bride of Lammermuir," he includes the remaining thirty years of the Scotch cycle, 1650 to 1680, and overlaps the time of the second group. At this point of his career, he began the English, or, as it is usually called, the Romance series, and only afterwards intercalated, as it were, single novels into this completed Scotch cycle, which already comprised his masterpieces. Thus, he added at intervals, "The Pirate," to the second group; "Redgauntlet," "The Two Drovers," "Highland Widow," and "Surgeon's Daughter," to the first; and attempted to begin a fourth group subsequent to any of them, in "St. Ronan's Well"; but this was unsuccessful. In fact, none of these intercalations are of first-class merit. In his English series he began with one of the best, "Ivanhoe," which forms a nucleus by itself for the end of the 12th century. In the succeeding group, "The Monastery," "The Abbot," "Kenilworth," "Fortunes of Nigel," and "Peveril of the Peak," is included the century from Elizabeth to Charles II., which brings us into conjunction with the starting-point of the Scotch series in "The Legend of Montrose." The remaining works either fill up the gap between "Ivanhoe" and this group, or immediately join on to groups already formed. Thus, "Quentin Durward" comes in immediately before the "Monastery"; "The Betrothed" and "The Talisman," immediately before "Ivanhoe"; "Woodstock" intercalates before "Peveril of the Peak"; "The Fair Maid of Perth," and "Anne of Geierstein," before "Quentin Durward"; "Robert of Paris" before "The Betrothed"; and "Castle Dangerous" before "The Fair Maid of Perth." But in no one instance do any of these come into the middle of or overlap the members of

already formed groups, as the subsidiary members of the Scotch series do. You will see from this: firstly, how a subjective treatment of modern history is possible without adhering to chronological order in the main groups; secondly, that within each group, which must have an extent in time varying with its historical importance, the chronological order should be kept; thirdly, that we have here an apparent solution of the difficulty raised by the opposing schools at present prevalent as to the order in which History should be taught; but, fourthly, that this sequence is only fitted for the mature mind, not for the child. If you doubt this, try the experiment of giving "Ivanhoe" and "Waverley" to boys to read, and see which has greatest hold on their memory—in fact, which teaches them most.

After this perhaps too long digression, I return to a matter of much greater importance, viz., that in the teaching of History, as in that of the other concrete sciences, scientific form must be carefully avoided during this stage. Scientific order must always guide the teacher, but never be obtruded on the pupil. The scientific arrangement of the multifarious facts of History, Botany, Zoology, etc., under the laws of their development, *e.g.*, Comte's Law of the Three Stages, Darwin's law of Natural Selection, or whatever laws may be in future discovered, must be made after the study of the corresponding abstract sciences in the subsequent educational stage, thus completing the statical study of each science by its correlative dynamical study. The necessity of treating the classification of the sciences themselves, before that of the arts depending on them, necessitated my omitting this matter in my previous lecture.

We next come to the arts or applied sciences depending on the abstract science of Psychology. These are usually termed the Fine Arts. I include also in this group as a distinct art one usually either omitted altogether or included in mutilated form in the other groups—the Art of Ornamentation. This is the most fundamental and earliest developed; then follow in order, Sculpture, Architecture, Music, Dancing, Painting, Poetry (Elocution). This will, I think, be found to be the arrangement of historical development. The first three do not enter largely into any recognized course of education. The tendency, however, to all of them is very early developed, as shown in the fondness for personal decoration (especially in girls); in the hanging up of coloured paper garlands for room ornamentation,

and the like ; in the continual whittling of the boy as soon as he can get a knife, and the cutting out of decorative forms in paper or cardboard ; in the delight evinced in building with boxes of toy-bricks, and so on. No doubt, the development of these tendencies is greatly neglected. The remaining four arts are universally appreciated, although generally taught on absurd methods. I cannot in this short course venture to make any observations on the methods that should be used, and must confine my remarks to saying that the order of introducing these arts should be that of their time-development in the history of the race, that the introduction of one should not be preceded, as in the abstract sciences, by the completion of the preceding one (thus, for instance the teaching of drawing should go on for all the latter part of the period simultaneously with that of music and poetry), and that the total amount of time bestowed on them should be about one quarter of the whole time spent on education in this stage. I have elsewhere* given a rough analysis of a scheme in which this becomes practicable. The great danger with regard to these arts is the same as that for the Abstract Science, the desire for specialism—the effort to produce a singing woman or painting man (or artist), instead of a developed man or woman, capable of song, able to paint. You will find valuable hints on this matter in Emerson's "Essays."

The concrete science attached to Psychology, the history of mind, can only effectually be studied in two forms : in Philology, the history of speech ; and in Literature, which is the history of thought. This field of study is so enormous that selection is even more difficult than in Natural History. But as in this latter we choose for general education the history of those nations which have most influenced ourselves in the past and are influencing them in the present, we must act similarly in the case of Language and Literature, remembering that we can here supplement our literary studies by translations, which, though not equivalents, are yet tolerable substitutes for the originals, as engravings are for pictures. No philological training worth having can be given with less than two languages, in addition to our own ; and Philology, and the practical uses of life alike, point to French and German as the two to be selected—one as a representative of the Latin stock, one of the Teutonic :

* In the *Journal of Education*, March 1882.

one as an example of logical precision, the other of grammatical flexibility and copiousness; both as giving access to stores of contemporary literature and science not otherwise attainable. Of course, the master-works in literature in these languages should not be neglected; but in literature generally our own is rich enough to supply the study of a life. Our great poets (and poetry is that part of literature of greatest educational value): Chaucer, Spenser, Milton, Shakespeare (and his contemporary dramatists), with the rest of the list down to Tennyson and Browning, furnish abundance of material. But here again, as on the question of the Fine Arts, I must confine myself to a few remarks; to exhaust the subject would require a volume. Literature, then, must be read and studied as literature, not as exercises in grammatical and antiquarian pedantry, as it too often is in our schools. It should be confined to the masterpieces of the master-minds; no second-rate work, however interesting in other ways, should be included. It should follow the order of historical development, from the myth or fairy tale and ballad up to the epic and the drama. Especial care should be taken to include in their proper sequence the sacred writings of the great religions, and those epics which can be truly termed national. Thus, hymns from the Veda should find a place as well as the Prophecies of Isaiah; the Mahabharata, the Achilleid, the Nibelungen, the Cid, Roland, and Arthur, should not be omitted. Of course this implies the use of translations, and in choosing translations two kinds, to be used simultaneously, should be selected—one as literal as possible without distortion of speech; the other as near in form to the original as the language will allow. The next best thing to reading the “Prometheus” or “Agamemnon” in the original, is to read Bouillet’s prose, in conjunction with Browning or Cayley’s verse; the best way for a reader unacquainted with the Italian of Dante, is to use Longfellow’s or Dr. Carlyle’s “Inferno,” along with Cayley. Above all, at the present time, endeavour should be made to guide the taste of the student away from the facile melodists and voluminous plagiarists who infest contemporary literature with productions that nearly always please the ear, seldom fail to defile the heart, and never succeed in satisfying the intellect. This should be done, not by forbidding the reading of them, but by carefully avoiding to have on one’s own shelves any ephemeral trash; by not wasting one’s own time in reading the last new sensation in

novels or poetry, merely because it happens to be talked about, or to be written up by some writer of the same clique; and by occasionally analysing to one's children the weakness of one of these nine-day wonders, and contrasting with it some really valuable work on the same subject by one of the master-men. Much of the teaching, direct or indirect in the Fine Arts, and the cognate pursuits in Literature and Language must be given, consciously or unconsciously, in the home and not at the school.

The art which bears the same relation to Biology as Law does to Sociology is Medicine. Neither of these to any great technical extent can enter into a general education. But just as the art of manners and ceremonial culture, which embraces all details relating to conduct in the social body does and ought to hold the next place in Education before Fine Art, as including such application of ethical and social law as young people can assimilate, so the art of preserving health, which includes all details relating to the individual body, must hold the next place before Material Art, as including such application of biological law as can be made intelligible to them; ventilation, temperature of rooms, food, exercise, and the like, not treated scientifically, but practically, by rules based on Science, form the staple of this course, which will be simple and not long. It is otherwise with the concrete science of Natural History—that is unlimited in extent. The principal difficulty here will be so to guide the selection as to include those instances which are most important. In order, the study of animals should precede that of vegetables, and the higher species should precede the lower, according to the law of psychologic interest, which proceeds from the familiar to the unfamiliar; the order should be: 1. Vertebrates; 2. Articulates; 3. Radiates; 4. Molluscs; 5. Worms; 6. Zoophytes; 7. Primitive Protozoa; for animals and for vegetables, which should be introduced long before the study of animals is finished: 1. Dicotyledons; 2. Monocotyledons; 3. Gymnosperms; 4. Ferns; 5. Mosses; 6. Sea-weeds; 7. Fungi. But although in this teaching or guidance to learning Natural History, care should be taken to introduce all the principal types, and care should also be taken to omit nothing of very special interest to man, such for instance as the chief domestic animals, the forest trees of our own country, the political institutions of ants and bees, etc., etc., still the great danger lies in the effort after completeness. I have heard

many object-lessons given, and nearly always the teacher seemed so overwhelmed by the novelty of the detail he had worked up the preceding evening as to lose all sense of its importance relatively to his pupils. He could not be expected to have learnt all that for nothing, and therefore it must out in a deluge. Not so does the mother teach; she simply answers her child's questions, often in such a way as to induce more, but never getting out of sight, as it were, of the child's intelligence. This is one of the chief reasons for supporting Comte's scheme of Domestic Education on the intellectual side; and if that cannot be attained, for decidedly condemning the system of teaching children under 14 in the same schools with those between 14 and 21. There should be no fixed lectures for these younger ones, no solitary tasks to be worked out by themselves, no competitive examinations. The business of the teacher should be simply to guide them to the spring of knowledge; they will drink fast enough of themselves. This is digressive repetition; but I cannot help it—it is of vital importance, and I must insist on it.

When at a later stage this body of facts in Natural History comes to be scientifically organized in the after education as the concrete part of Biological Science, how is it to be done? Is a mere classification to be attempted, or is the doctrine of Evolution to be taken as the guide? This is a most important question for those who hold Positive doctrines. It is a common objection to Comte's philosophy to say that his rejection of Evolution, of ternary chemical compounds, of a luminiferous ether, imposes a finality on scientific investigation, and assumes a sort of scientific inspiration on Comte's part. It might be deemed sufficient to give a general reply, that no one takes Comte to have been inspired; and that no one is bound to any special doctrine of his as an article of faith. If, however, any one should give this reply, and still go on maintaining any scientific dogma, *after it had been disproved*, simply because Comte held it, he would, I take it, be acting in a spirit, not of Positive philosophy, but of political party or of theologic bigotry. It is well, therefore, here, for me, who believe in Evolution, to recalc to you Comte's own words ("Philosophie," iii., 388, *seq.*; edn. 1869). Speaking of the theory of Lamarck, the real founder of this theory, he says: "Lamarck was incontestably the man who showed the clearest and deepest feeling of the true organic classification (*hiérarchie*), while

Cuvier, who never opposed it on fundamental grounds, often mistook its most essential philosophic character." He says again: "The only attribute of the (organic) series which can be affected by such a controversy consists simply in the necessity of conformity or discontinuity in organic progression." And again, fully admitting that the question is not settled, he says: "*Whatever may be* the final decision of this great biologic question, it cannot really effect in any way the fundamental existence of organic classification." He even admits that "it is probably after a series of analogous eliminations that biologic harmony *must* have gradually become established on our planet, where in fact we still see it continually modified in a similar way." Were it not that he afterwards insists on a narrow limitation of these variations—a limitation, be it observed, purely arbitrary and subjective—this would be simple Darwinism. It is clear that, however strongly Comte *believed* Lamarck to be wrong, he did not regard the rejection of Evolution as scientifically proved.* I see no objection, therefore, to the most thorough Positivist making this theory his basis of educational work.

With regard to the concrete teaching of Physics, the same principles hold as for the other concrete sciences. The teacher must be careful to select such instances as shall form a sufficient basis for the after abstract generalisations; these will be drawn from the Concrete Science, or History of our Planet, from Meteorology and Geology (not excluding Palæontology, which is founded on the preceding science of Natural History), while at the same time care is taken in the selection to follow the order of psychological interest, and to prefer those instances which have a direct practical application. But I cannot insist too strongly on the principle that abstract science should be deferred to the after stage. No theory of chemical atoms, of luminous undulations, or the like, is as yet admissible in our course. Scientific explanations at this stage should not be carried more than one step back, and should not be traced so far as to anticipate the subsequent training. The practical rule is this: as in abstract training

* In the "Polity," vol. iv., Comte introduces hypotheses of his own on the possible future development of Herbivora into Carnivora, and a Parthenogenetic Utopia for women, which are more Evolutionary than anything that Lamarck, Darwin, or Spencer have taught, or would even regard as admissible.

the hierarchic order is followed, Physics following Mathematics, Biology following Physics, and so on; so in concrete training, the inverse order being followed, nothing must be taught in concrete Physics requiring mathematical explanation, nothing in concrete Biology requiring physical explanation, and so through the whole scheme. We are here concerned with facts, and facts only, as far as they come within the range of the universe of each science; national facts not being admissible in Ethics during this first course, nor psychologic facts in History, nor anatomic facts in the Fine Arts, nor chemical facts in Natural History, nor mathematical facts in Geology. In the practice of the present time this rule is hardly ever observed, owing to the confusion that exists in the minds of our theorists between the abstract order of the Sciences and the concrete order of the Arts; yet I venture to say that no more important or practical principle for Education has ever been evolved.

It should also be borne in mind that although the abstract scientific treatment must not be anticipated, the scientific method must through the whole of this early training be carefully enforced and cultivated to the utmost possible extent. Especially is this necessary in Physics, whether abstract or concrete. Experiment, the basis of physical method, should be not an ornamental, but an integral part of the work. I do not mean experiments shown to, but performed by, the pupils, and as far as possible with apparatus, not provided for them, but extemporized out of ordinary household appliances or made purposely by themselves. No one who has not seen this system tried can tell the value of the results in education. I have seen it and tried it, and I speak without diffidence on this matter. A few months of such training is of more value than years of catechisms and Latin primers, and working out ingenious arithmetical conundrums. In like manner, in Biology (abstract or concrete): here comparison is the method to be adopted, and can be best carried out by botanical classification, not learned from books, but gained by dissection of flowers, etc., with drawings of vertical and horizontal sections, the specimens being provided and dissected by the pupils, not for them by the teachers, or, what is still worse, taken from books where the results of other people's work is given. Similar results may be gained by dissection of animals (insects for

example). For my own part, however, I recoil from teaching children to take life in any form for purposes of science, and would on no account endeavour to mould them into future vivisectionists.

With regard to the drawings mentioned above, they should not be copies of nature, but abstract diagrams representing no facts but those especially under consideration, *e.g.*, the number, insertion, relative symmetry of petals, sepals, or stamens. The fertile principle of rigid exclusion of extraneous matter in pupils' exercises is little understood, and often counteracted by the silly practice of requiring themes and other compositions of at least a specified length. I do not remember ever seeing a schoolmaster give credit for the shortest exercise in which a given number of ideas could be contained. Yet this, though not unobjectionable, would be far better than the prevalent practice.

Corresponding also to Physical Science come the Material Arts—the Arts of Bodily Comfort,—Building, Clothing, Cooking, etc. These should be taught with experimental illustration founded on, not identical with, Physical Science; the limitations to scientific explanation I have already laid down. Finally, the art of Mechanism, which correlates to the latter group of the mathematical sciences; and that of Mechanical Drawing, which correlates to the former group, should be taught. Of course, the Mechanism should be illustrated by examples of actual simple machines, and as far as possible by models made by the pupils themselves. In Mathematical Drawing and Arithmetic we arrive at the boundary on passing which we reach Geometry and Algebra, the beginning of the course of Abstract Science. Of Arithmetic I shall only say here that it is usually taught far too early, and so are Reading and Writing. Comte quite rightly tells us that Drawing should precede Writing and Music Reading. The inversion that we make of this natural order, an order declared alike in the History of the Race and in the Hierarchy of the Arts, as I have attempted to lay it before you, is one, probably the main, reason for the poor success of our efforts at National Education. We insist on Reading and Writing as the first things to be done; until children can pass in these we do not pay, and therefore the schoolmaster keeps the poor little drudges in one monotonous attempt to master the enormous difficulties of our heterography until their interest

in all learning is gone and their faculties permanently dulled. It may seem Utopian to ask that a national government should teach fairy tales and ballads, singing and drawing, before reading and writing. Still, I venture to assert that it is in this way that the greatest economy would be obtained, and even that it is in this way only that the work can be effectually done. It is proved by experiment that drawing (to the necessary extent) and writing together, can be taught in less time than writing alone; and unless interest be excited,—and this is the secret of all early education,—the continuous attention necessary to acquire reading and writing will never be attained; but give a child an interest in tales, songs, and ballads, and he will learn to read in order to get at them; give him an interest in drawing, he will soon draw letters and then write them. We are quite wrong in trying to increase the amount of education by inserting new subjects at the end of this primary educational course; it is at the beginning that the insertions are needed. Only thus can we conform to the order of race history, and only by so conforming can our systems succeed.

The history of the heavenly bodies, which is usually called Descriptive Astronomy, is the only remaining portion of this course; it correlates to the Kinetic division of Mathematics, and requires no observation here except that teachers should be content to ignore useless details and to sketch broadly rather than delicately. The Art of Navigation, with facts about currents, winds, etc., would also require some notice.

I have now gone over, with as much detail as my limited time will allow, the ground which, mainly under Comte's guidance, I believe Education ought to cover. It is not practicable now, perhaps never will be practicable, that the whole human race should obtain a complete education; but it is desirable in this, as in all things, that we should have distinctly before us the limiting Ideal to be aimed at, even though we know that approximation and not attainment is all we can hope for. This much at any rate is attainable: Education in the Arts or Applied Sciences, and in the Historical or Concrete Sciences for all, and Education in the Abstract Sciences for those who have in any way committed to them the guidance of others. Whether as Poet, Ruler, or Teacher, as Scientist, Capitalist, or Physician, this is absolutely needful for the well-being of Society. Especially needful is it for those who are the

representatives of the two supreme Powers, Political and Spiritual. In the separation of these Powers, and in the insistent way that he reiterates the necessity of complete training for their concrete representatives, the Priesthood and the Government, I feel the superiority of Comte to all others who have treated of this subject. In a time of specialism like ours, where anarchy pervades all the provinces of the domain of thought, this is the one central doctrine that needs most to be insisted on. In our time all guides of public opinion alike, scientists and politicians, critics and writers for the press, schoolmasters and professors, preachers and divines, are for the most part special-ists, who view the universe from their own narrow stand-points, and have no central all-embracing philosophy on which to erect their polity or their religion. Hence, in practice, immediate expediency becomes the practical guide, and the most momentous questions are decided with as little reference to general principles as the choice of a new dress or the selection of the dishes for to-morrow's dinner. Hence such results as our wars in India, Zululand, and Egypt; hence our Irish troubles; hence our Education Acts. Everything is arranged as compromise between what are too often equally absurd extreme opinions. Any one who should attempt to direct legislation on philosophical grounds would be nearly as much laughed at in the House of Commons as if he were to assign a Christian basis for his opinions. And yet, as Comte tells us, without a determinate Code of Principles, without an enlightened Public Opinion, without a thorough system of Education, permanent Progress is not to be hoped for. The immediate practical question is, which of these may we hope to influence first, so as to thereby affect the others? Some may think that public opinion can be reached most easily; but without wishing in any way to deprecate efforts in this direction, which ought undoubtedly to be strenuous and unintermittent, I venture to think that this is only secondary. So long as public opinion is uneducated, so long as its chief guides, whether in press, pulpit, or Parliament, are uneducated, but little can be effected in this direction. The main advance will be, must be, made by the slower but surer path of Education; and the particular point for attack is at present, I believe, specialism. If Positivism is to advance in England it must be by a Positive and organised system of Education both in Abstract and in Concrete and Applied Sciences. The latter branch may

ultimately be replaced, but not yet, by family education ; in the meantime it should be elsewhere provided in proper form.

I speak here with the utmost diffidence as to what this form should be. For Comte himself, who had to found a philosophy, unquestionably the Abstract teaching was the important question : for his successors, for the leaders of Positive thought, it no doubt continues to be so. To the rich who can even at the present time arrange for a home education for their children, the earlier education presents no insoluble problem. But it is not to the rich or to the intellectual that Positive Education should make its first appeal: it is to Humanity, and an Educational appeal to Humanity must be through that Education which all need alike. At the risk, then, of apparently forsaking Comte's principle of Home Education until 14, I express my individual opinion that it is by offering a Positive Education to children under 14 that the first step should be made.

One or two remarks by way of summary. There are a few considerations which seem to me so important that I shall repeat them, even though I introduce them somewhat unsystematically and regardless of the charge of tautologic reiteration. The first is that, in judging of Comte's whole scheme, we must not be misled by those critics who complain that he laid down as final dogmas statements disproved by further investigation, and that therefore his philosophy must as a whole be given up. I have tried already to show you that however strongly he at times expressed himself on the theory of Evolution, he was far from holding it disproved in the same way as the Ptolemaic system of the universe, or the theory of Phlogiston, are disproved; all he really meant was "with the evidence now before me, I think it most improbable that the theory of Evolution should ever become probable." To one so strongly impressed as Comte was with the relativity of all knowledge, nothing would be more unlikely than the possibility of making any positively final assertion on a highly complex subject such as this. It is a necessity in the exposition of a complicated subject to state a highly probable hypothesis and in subsequent reference to it to omit qualificatory clauses, such as "It seems to me," "I think," etc. The original statement that it is a hypothesis is enough qualification. Comte says that all knowledge is relative, he need not

repeat this modifying statement on every page. So De Morgan said he was ready to believe on sufficient evidence that there were universes in which 2 and 2 made 5, that even mathematical truths are not positively final. Comte would have admitted any change whatever in his philosophical exposition on sufficient evidence. No one was more opposed to finality, but he wanted progress to be orderly, not anarchic and special. *Hinc illæ iræ.*

I have tried also to correct a prevalent error as to Comte's historic method of teaching. He never mentioned a great principle without naming its discoverer; it was through him that the connexion between Descartes and the geometry called co-ordinate was revived in the minds of mathematicians, and in his treatise on that subject you may find many illustrations of this principle, but at the same time no one was more averse to teaching the sciences themselves in the historic order of discovery. He says, "I think no science is completely known unless we know its history; but this study must be regarded as entirely separate from the true dogmatic study of the science, without which the history can not even be intelligible." "Philosophie," i. 65.

And now, to fix our ideas, let us for a moment regard the whole career of a man,* from birth to death, under this Utopian scheme. From birth to the age of 7 he is nurtured by his mother in all right doing, especially in that self-restraint without which continued right doing is impossible. Nothing but the loving worship of the mother can efficiently cultivate this; during the next stage, if not still under the watchful guardianship of the mother herself, then under the guidance likeliest to the mother's that may be procurable, he acquires such mastery in art, such knowledge of the concrete world, as may serve as the foundation for his after-work in life. If this afterwork be devoted to the guidance of others, he must serve a yet further educational apprenticeship to obtain his complete equipment for the life-battle—knowledge of the abstract laws that govern the material universe, and the smaller but more important world of Humanity; during this time he is not to be looked on so much as the recipient of the homage of the mother as the loving and obedient subject, follower, or worshipper if you please, of his father; in the next stage

* That of a woman differs only after the education is completed, at 21.

he has to acquire that technical mastery which comes only by long and arduous toil, and sometime in this period he becomes the chivalrous worshipper of her who is to be to him the chosen representative of Humanity, when at 28 he makes his final choice of a destination, and by his marriage founds a new family, a fresh unit in the social organism. Thenceforth he is no longer a separate atom, he is bound by family duties, by social duties; he is a servant of Humanity, whether as capitalist, as health director, as artist, as lawyer, or as Educator; his whole work for the future until his final retirement at 63 is to be directed, not to himself, but to that social organism, of which that family is a molecule, wherein he is merely one of the atoms.

If he be not one destined to guide others, if he have the happier lot of following their guidance, his educational career in the third stage may be somewhat shorter, and his abstract knowledge less; but the main features of his career will in other respects be the same; he himself will be equally devoted to the service of Humanity; and so far as this may be the final end of Education, so far as the means adopted to prepare for it are scientific studies pursued in due order, in the order from Familiar to Unfamiliar for the early stage; from Abstract to Concrete for the latter—just so far is the Education Positive. So far is it fitted to guide Man in his orderly progress towards that highest development of which his race is capable.

Finally, I would wish you carefully to consider how the history of Education confirms Comte's views. From the time of Aristotle the idea of Education was always to include in the curriculum all arts, all histories, all sciences, then known. It was not the fault of the centuries anterior to the 18th that their Science was confined nearly to the mathematical group, or the fault of the Middle Ages that Latin and Greek formed their sole means of getting at an extensive and valuable literature: it is our fault in modern times that we have been so slow to recognize that the necessity for these dead languages has passed away, while the claims of the sciences of the physical, biological, psychological, and sociological groups are clamorous for recognition; it is also our glory to have recognized that Education should not be confined to a few, but extended to all, because every human being has moral feelings demanding to be cultivated by means of accurate knowledge with a view to right action. For the best exposition of this doctrine, Humanity is indebted to Auguste Comte.

P.S.—The tabular scheme hereafter appended will be useful for reference while reading Lectures II. and III. I ought to state, however, that this scheme has been specially arranged to illustrate Comte's views. My own classification is this :—

- | | |
|----------------|----------------|
| 1. Mathematics | |
| 2. Physics | 6. Ethics |
| 3. Biology | 5. Sociology |
| | 4. Psychology. |

If this arrangement be wound on a cylinder, it will give us, not the linear arrangement of Comte, which is necessary for Educational ends, but a binary arrangement, which shows the analogy of Biology and Sociology as developed by H. Spencer, and the intimate connexion of the divisions of the sciences of Mind and Matter as required by a monistic philosophy, thus—

Mathematics	Psychology
Physics	Ethics
Biology	Sociology.

The primary subdivisions of the Mind and Matter sciences will then be—

MATHEMATICS.

(*Matter*).

1. Number
2. Space
3. Velocity
4. Acceleration
5. Mass (Matter)
6. Virtual Velocity
7. Physical Work

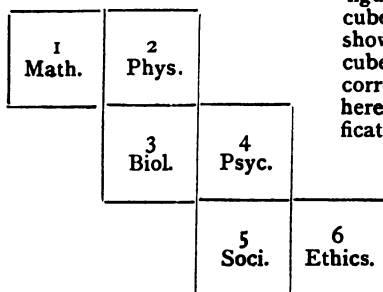
PSYCHOLOGY.

(*Mind*).

1. Intension
2. Comprehension (Comparison)
3. Duration (Retentiveness)
4. Change (Difference)
5. Mind
6. Will
7. Mental Energy ;

and those given in the table will be relegated to a secondary plan. This is not the place to develope such a scheme, but this note is necessary to prevent any charge of inconsistency. If the annexed

figure be cut out and folded into a cube, the binary classification will be shown by the opposite sides of the cube representing mind and matter correlations, the unfolded figure as here given showing the linear classification.



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